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# THE CONDOR

A Magazine of Western  
Ornithology



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# THE CONDOR

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Edited by

JOSEPH GRINNELL

JEAN M. LINSDALE

ALDEN H. MILLER

Associate Editors



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JANUARY-FEBRUARY, 1933

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## RANGE RESTRICTION OF THE LONG-BILLED CURLEW

WITH SIX ILLUSTRATIONS

By JOHN W. SUGDEN

Awakening with the dawn, the clear calls of the Long-billed Curlew (*Numenius americanus*) carry across the alkali flats and marshes of the inter-mountain region, and from this association the bird comes, during at least the months of April, May and June, to typify this area.

Characteristically a bird of the open prairie, the curlew or sickle-bill chooses in particular the flat open country about the sloughs bordering the Great Salt Lake, Utah, or similar localities about other brackish lakes or sloughs in the adjacent valleys, but not the mountain meadows about the snow-fed fresh water lakes. Its local range is limited by the sage-brush foothills of the mountains. Such places may be found over the broad country between Plain City and the lake, about the Black Sloughs which mark the mouth of the Jordan River, and on the higher grass and weed covered fields of the great Bear River Marshes.

Formerly this magnificent bird ranged over the entire width of the United States but, with the advance of settlement and cultivation of the prairies, its range has retreated westwardly so that now the numbers noticeable on the marshes and flats about the Great Salt Lake represent rather a concentration in a restricted range than an increase in the number of birds. They have decreased notably, but fortunately not to the tragic stage of its near relative, the Eskimo Curlew.

Even here, where the high alkaline content of the soil and poor drainage make agriculture impossible, the range is being further restricted and the nesting birds disturbed by the pasturing of stock. Cattle and sheep, especially the latter, ranging over the breeding ranges during the spring of the year, seriously molest the birds and drive them to other locations. A herd of sheep grazing over the flats will effectively cover every square foot of ground and trample the nests underfoot after having driven the birds off. Cattle do not cause the same amount of disturbance. The herds are not as large and are more scattered, with the individuals grazing separately instead of in mass formation. Apparently the cow will avoid the curlew nest or be frightened away by the flushing bird; but with a flock of sheep the followers crowd behind and trample everything. It is not unusual to find curlews nesting where cattle are grazing in small numbers.

The sheep, however, constitute the greatest menace, particularly during the bird's breeding season, as it is then that they roam the flats before being driven to their summer range at higher altitudes. The curlew cannot compete with the sheep, so must move to the more inaccessible corners, where vegetation is scarce or is not suitable for grazing.



Fig. 1. NEST AND EGGS OF THE LONG-BILLED CURLEW SITUATED IN A FIELD WHERE HORSES WERE PASTURED.

Photographs with this article taken by J. W. Sugden, all at the Bear River Marshes, Plain City or Black Sloughs, near the Great Salt Lake.



Fig. 2. THE "HERRING-BONE" PATTERN OF MARKINGS IS EFFECTIVE FOR CONCEALING COLORATION; ONLY THE EYE OF THE BIRD STANDS OUT PROMINENTLY.

The feeding birds are apt to be gregarious, especially in the vicinity of the nesting region, possibly due to the congregation of birds that are not busy on the nest. At the Bear River Marshes, a flock of about fifty was observed feeding in a thirty acre field. The birds remained together and flew from one part of the field to another in groups of ten or fifteen. No nests were found in this field; but in another, of more sparse vegetation and less desirable as a feeding area, several nests with eggs were located. The birds seldom or never run, but walk gracefully with a backward and forward motion, pausing as they reach from side to side to pick up a grasshopper, beetle or other insect with the long curved bill.

In the field, the bird can be easily and unmistakably identified by its large size (the largest of the Charadriodea), brownish or cinnamon color, long legs and long prominent down-curved bill. The Long-billed Curlew is larger and has a longer bill than the Hudsonian Curlew (*Phaeopus hudsonicus*), whose breeding range does not extend as far south. The Marbled Godwit (*Limosa fedoa*), an occasional visitor here, is similar in color but is smaller and has a straight bill. At a distance, the Long-billed Curlew presents a monochrome color, lighter on the underside. The characteristic cross markings of the feathers, giving the "herring bone" effect, are remarkably effective in concealing the bird, both while on the nest in the low patches of vegetation and while feeding in the higher grass. The sexes are similarly colored.

The Long-billed Curlew is shy and rather noisy when alone or feeding in flocks, but on its breeding grounds when defending the nesting site it becomes aggressive and boisterous. The characteristic note is a loud, clear, resonant *kier-lee-u-u* repeated several times at the rate of about thirty or forty a minute. The last syllable is prolonged and sometimes sounds more like *kier-le-e-e*. It lacks the shuffling quality of the willet call. As the birds fly overhead, uttering their cries, the long curved bill can be easily seen opening with each syllable as the head is turned from side to side. When a bird is flushed from the nest it utters a rapid, rolling, low-pitched sound while hurrying over the ground and a sudden burst of angry protest as it takes to wing.

A shallow saucer-shaped depression lined with a few sticks and grass usually serves as a nest, but sometimes, especially if located in a clump of grass, it may become a rather substantial affair. It may be located in a patch of grass or low growing vegetation or entirely exposed in the open alkali flat; but even in this position it may be extremely difficult to locate because of other similar irregular patches of dirt and vegetation. Even after carefully marking the location of a nest, it often is impossible directly to approach it on a subsequent visit.

Four or sometimes three eggs is the usual number, but occasionally five to eight may be found in the same nest, evidently the product of two females. The hollow of the nest is just large enough to hold the ovate or round ovate, olive-buff eggs. The ground color of the eggs may have a distinct greenish or brownish shade and the fine to medium sized brownish olive markings are usually evenly distributed. On one occasion, a well marked single egg was found in the branches of a sage-bush far from the nesting grounds. Evidently it had been dropped in flight, as the egg had not been incubated and the shell had been punctured by a sage-bush stem. The average dimensions of fifty eggs collected at either Plain City, Black Sloughs, or the Bear River Marshes are: length, 66 mm.; width, 47.4. They vary in length from 59.6 to 74.1 and in width from 42.2 to 50.2 mm.

The incubating bird spreads out over the nest, with the twenty centimeter bill extended, its tip resting on the ground, depending on the general concealing coloration for protection. The peculiar checkered markings of the feathers simulate closely



Fig. 3. TYPICAL EGGS OF LONG-BILLED CURLEW IN A WELL CONSTRUCTED NEST.

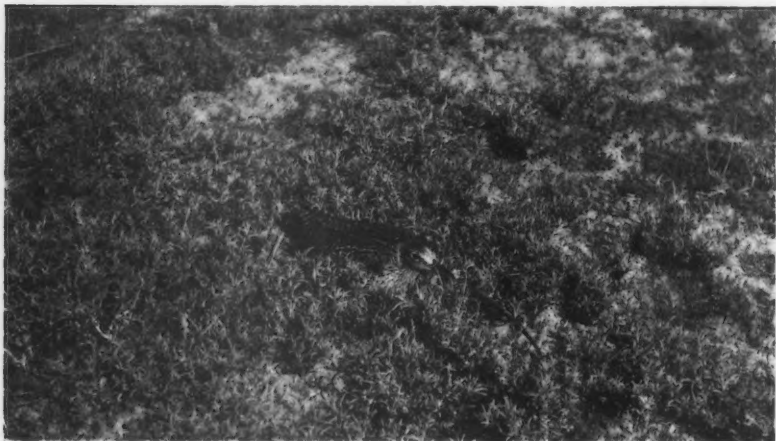


Fig. 4. THE LONG-BILLED CURLEW SPREADS OUT OVER ITS NEST, WITH THE TIP OF ITS BILL RESTING ON THE GROUND.

the growth of salt weed or mineral weed scattered over the alkali flats. With this sense of security, the bird holds to the nest until certain that it has been observed or is in danger actually of being trampled upon. If a person is cautious, avoiding sudden motions, the site may be passed within a few feet without the bird flushing. So effectual is the concealing coloration that the entire bird, bill and all, blends with the background and the black bead-like eye alone stands out prominently; often this is the most effective means of relocating the nesting bird.

Once while I was examining a large field, a Short-eared Owl (*Asio flammeus*) left its nest about forty feet distant, but a surprise came when a curlew, which had not been noticed, burst off its nest not a pace away. The bird had boldly remained motionless and did not reveal its position until blundered upon by the observer who failed to see or even suspect the nearness of the bird. The more cautious and frightened owl had left on the first hint of being approached, although she had a nest containing six young of different ages and one egg that was near the hatching point. Western Willets (*Catoptrophorus semipalmatus inornatus*) often choose the same general nesting region, and the nests of curlews and willets may be found very closely placed, with occasionally one or the other kind of egg in the wrong nest.

If approached carefully, quietly and slowly, especially if near the end of the incubation time, the nesting curlew may allow itself to be gently stroked or even lifted a little from the nest. The satisfaction of such an experience, the stroking of a wild bird on its nest, compensates for the many weary steps required in locating the site and earns for the faithful bird the safety of its household and the admiration of the observer. Meanwhile, the mate has been anxiously and noisily endeavoring to protect the nest. It circles about with angry cries and frequently swoops toward the observer, suddenly banking upward with a shrill cry as it whirs past within inches of striking.

The birds often feign an injury and limp away from the nest with extended wings dragging at a ridiculous angle, in an attempt to induce the disturber to follow them away from their valuable nests. However, they do not practice this ruse to the same extent as do Black-necked Stilts (*Himantopus mexicanus*). A dozen of these latter birds may be dancing about at the same time, whether their nests be in danger or not. After trailing along, always away from the nest, if followed or if it is satisfied that the trick did not work, the curlew takes to wing with a burst of noise. Probably both sexes share in the incubation of the eggs, or at least the male assists, as is a common procedure in some others of the shore-bird group.

The young are reported as hatching in about thirty days and soon after are able to use their legs and run rapidly. Such is the advantage of relatively large eggs containing an abundance of food material, allowing considerable development prior to hatching. The young are adept in concealing themselves, relying upon their coloration to make themselves inconspicuous when lying motionless among the low vegetation. The fledglings will scurry over the ground on their long awkward looking legs and suddenly "freeze," quail-like, disappearing from sight. Even with the well developed concealing coloration, the mortality among the young must be high, as it is unusual to see more than two chicks being solicitously guarded by their parents. When in danger, the adults become considerably excited and anxiously coach their offspring to safety.

By the middle of April, the curlew are on the nesting grounds and nidification has begun. Fresh eggs are in the nests during the first week in May, and the following month the young are about. Depending upon weather conditions, the above dates may vary. In 1929, spring in the intermountain region was unusually delayed





Fig. 5. OCCASIONALLY A CURLEW'S EGG MAY BE DEPOSITED IN A WILLET'S NEST.



Fig. 6. IF CAUTIOUSLY APPROACHED, THE INCUBATING BIRD MAY ALLOW ITSELF TO BE GENTLY STROKED.

and at the beginning of the period the nesting was considerably retarded, but the difference became less noticeable as the season advanced.

Toward the middle of September, the juvenile birds are grown and are ready to respond to the migratory urge to seek the more equable climate farther south; and by the first of October only stragglers are left. Very few, if any, Long-billed Curlews pass the winter in the vicinity of the Great Salt Lake.

Certain evidence, although not indisputable, tends to show that additional eggs or a second set may be laid if the first is disturbed or destroyed. Occasionally nests containing fresh eggs may be found as late as June, after young of the first brood have appeared. A female curlew, that had been shot with a .22 caliber rifle by some boys roaming over the grounds, contained one large egg about to be laid and the nest was later found containing three deserted eggs. In addition the ovary contained twelve more ova in various stages of development. Potentially there were enough ova for three additional sets and the larger of these were of sufficient size to continue development if allowed to.

The breeding range of the Long-billed Curlew has been greatly reduced by its inability to compete with the advancement of civilization and now it occupies but a restricted area in the Great Basin. Further restriction seems inevitable with the attempts to drain the alkaline sloughs and with the more serious menace of ranging stock, especially sheep, over the grounds during the breeding season. The question then is: Can the Long-billed Curlew hold out against these factors or modify its habits so as to be able to rear enough young to offset these decimating factors and return at least the same number of birds to the breeding grounds each spring? It is doubtful.

*Salt Lake City, Utah, October 20, 1932.*

## CLOSING HISTORY OF THE GUADALUPE CARACARA

By CLINTON G. ABBOTT

There is sentimental as well as scientific interest in a vanishing or extinct species. With what tender accuracy was every bone recorded of the last Passenger Pigeon, whose ancestors had been rudely hawked in the market at five cents a dozen! How carefully, at the present time, is every activity of the sole surviving Heath Hen observed, though formerly the main attention to this species was doubtless as a prospective ingredient of the pot-pie.

Sentiment, therefore, has probably played some part in my interest in the Guadalupe Caracara (*Polyborus lutosus*), although the main influence has unquestionably been the fact that the San Diego Society of Natural History owns three skins of this now extinct bird, of which comparatively few specimens are in existence anywhere. For this proud possession, San Diego can thank the fact that it is a seaport and is situated in the southwest corner of the United States—nearest point in our country to Guadalupe Island, Mexico, former home of this caracara.

Before it was too late to get them I have obtained and here record the remarks of some people who have seen the Guadalupe Caracara in life. I have also made an attempt to list the existing skins. H. S. Swarth wrote me that the California Academy of Sciences formerly had an excellent series of *Polyborus lutosus*, but that they were all destroyed, together with the accompanying records, in the San Francisco fire of 1906. The birds whose skins I have been able to find now extant were taken by only five persons, namely: Edward Palmer, field collector, who secured twenty-four birds in 1875; W. E. Bryant, one-time Curator of Birds at the California Academy of Sciences, two of whose birds, taken in 1885 and 1886, remain; A. W. Anthony, field collector, who secured one bird in 1896; Harry Drent, goat hunter, who brought four birds alive to San Diego in 1898, of which one has been preserved; and Rollo Beck, field collector, who secured nine birds in 1900.

Of this total of thirty-seven recorded specimens I have found the present locations of thirty-four. Two of Palmer's birds and one of Beck's are still unaccounted for, the others being distributed as follows:

U. S. National Museum, 14 (all, including the type, taken by Palmer).

Tring Museum, England, 5 (all taken by Beck)\*.

San Diego Society of Natural History, 3 (all taken by Palmer).

American Museum of Natural History (Sanford collection), 2 (1 taken by Palmer and 1 by Beck).

British Museum of Natural History, 2 (both taken by Palmer).

Castle Museum, Norwich, England, 2 (both taken by Palmer).

Thayer Collection, Lancaster, Massachusetts, 2 (both taken by Beck)\*.

Carnegie Museum, 1 (taken by Anthony).

Field Museum, 1 (taken by Bryant).

Museum of Comparative Zoology (Brewster collection), 1 (taken by Drent, skinned by Holzner).

Park Museum, Providence, 1 (taken by Bryant).

In the original description of *Polyborus lutosus* (Ridgway, U. S. Geol. and Geog. Surv. Terr., 1, 1876, p. 459) twenty specimens are recorded as being in the U. S. National Museum at that time, collected by Dr. E. Palmer, all with collector's numbers, but only six with dates of capture (five on May 10 and one April 11). All were taken in 1875. Dr. A. Wetmore informs me that fourteen of the series

\*Since the preparation of this paper was started, a large proportion of the Tring Museum collection of birds, presumably including the five specimens of Guadalupe Caracara, has been purchased by the American Museum of Natural History; and the two Thayer collection birds have been given to the Museum of Comparative Zoology.

still remain in the National Museum. Of the other six, the records show that two were sent to J. H. Gurney in England in 1882, one was sent to the Mombusho Museum in Tokyo in 1877, one was sent to Graf von Berlepsch in 1882, and one was sent to O. Salvin in 1876. "One more was apparently sent in exchange," states Dr. Wetmore, "but we have no record or entry marked off in the catalog."

The Gurney birds are those now in the Castle Museum, Norwich, and the Salvin bird is one of the two now possessed by the British Museum. Although Count von Berlepsch's collection went to the Senckenberg Museum, Frankfurt-on-Main (see *Auk*, XLVII, 1931, pp. 381-382), no specimen of *Polyborus lutosus* can now be found there. The present curator wrote me: "Because of the fact that Berlepsch was not particularly interested in birds of prey I would not be surprised if at some time he had exchanged the specimen you are seeking for something else."

The skin that went from Washington to the Mombusho Museum is apparently lost forever, destroyed—like the caracara specimens at the California Academy of Sciences—as the result of an earthquake. The Director of the Tokyo Science Museum writes: "The specimen you require might have been sent in 1877 from the Smithsonian Institution to the Mombusho Museum. However, I could not find any record or specimen after the terrible earthquake we experienced in Tokyo, 1923, when we lost numerous valuable specimens and their records altogether. Now the Tokyo Science Museum, formerly known as the Mombusho Museum of Tokyo, is opened in a new building in Ueno Park."

I have learned by correspondence that there are no specimens in the following collections: Museum of Vertebrate Zoology, Berkeley; Philadelphia Academy of Natural Sciences; J. H. Fleming collection, Toronto, Canada; Free Public Museum, Liverpool; Paris Museum of Natural History; Zoological Museum of the University of Berlin; and Natural History Museum of Vienna.

Turning our attention to the three birds in San Diego, which are without original data, I find an entry in the minutes of a meeting of the San Diego Society of Natural History held August 20, 1875 (less than a year after the foundation of the Society) as follows: "Donations were received of vultures and an owl from Guadalupe Island by W. W. Stewart." We can no longer find the owl (presumably a Burrowing Owl), but the vultures were beyond doubt the three caracaras. We have the evidence hereinafter presented that they were collected by Dr Palmer, and the W. W. Stewart may have been in some way connected with "Mr. Harry Stewart of San Diego," who is recorded as Dr. Palmer's assistant (*Bull. Calif. Acad. Sci.*, 2, 1887, p. 281). Since Dr. Palmer's Guadalupe bird collection, the bulk of which went to the Smithsonian Institution, was made in the spring of 1875, but little time elapsed before the three caracaras came into the possession of the San Diego Society of Natural History, in August of the same year. At my request, Daniel Cleveland, a charter member of the San Diego Society of Natural History, placed in writing, before he died in 1929, what he knew of the three caracaras. Under date of May 17, 1928, he wrote:

"Your favor of the 15th inst., relating to the skins of the Guadalupe Island eagle now in our Museum, was received yesterday. I have a very distinct recollection of the circumstances relating to our acquisition of these skins. I knew Dr. Edward Palmer, from whom these skins were received, very well. He was, and for many years had been, a professional collector of natural history material, mostly for the Smithsonian and U. S. Gov't institutions. He made several visits to San Diego. He was much more closely associated with me than with any other person at San Diego, and I accompanied him on a few of his collecting trips in the neighborhood of this city.

"About 1875 Dr. Palmer spent several weeks at Guadalupe Island, and returned to San Diego with much scientific material, including, as I recollect, about a dozen skins of the Guadalupe eagle, which he knew to be a rare bird in process of extinction. Largely influenced by his friendship for me, and at my suggestion, as I believe, he donated the skins of this bird now in our possession.

"About 1897, a fisherman captured six of the living eagles on the island, and brought them to San Diego, where he kept them in a large cage, and where, as I remember, all of them died within about a month. The man professed to want to sell these birds, but demanded \$150 each for them, and refused all offers for less. I was very anxious to purchase a pair of them, but could not afford to pay the price demanded. So the man's greed resulted in our failure to rear some of these birds in captivity and in his own loss from his failure to sell the birds."

Frank Stephens, now in his eighty-fourth year and still an active member of the San Diego Natural History Museum staff, recorded for me his memory of this last-named incident, which differs as to the number of caged caracaras, as follows:

"A man whose name I forget, caught one alive and had it in a cage here in San Diego for a time. He tried to sell it but could not find a buyer at the price he asked, and rather than take a small price killed the bird, cut off its wings and threw the body in the bay. Some boys found it and took it to Frank Holzner who retrieved the wings and made a study skin of the specimen." The present whereabouts of this skin, definitely recalled by Stephens as having the wings "sewn on," is unknown. The only Holzner-made skin on record is that in the Brewster collection at the Museum of Comparative Zoology. Its label reads: "Collection Frank X. Holzner, female immature, San Diego, California, March 18, 1898, brought alive to lab., skinned for mounting, ovaries enlarged, 2 eggs nearly developed." Dr. Barbour, in conveying this information, states that "the wings were never cut off. There is no sign of anything of the sort."

Recently, A. M. Ingersoll, another member of the San Diego Society of Natural History, has given me a valuable newspaper clipping written at the time the live caracaras were brought from Guadalupe Island. Unfortunately the source and date of the clipping are unknown, and our searches through files of San Diego papers in an attempt to secure this information have been unsuccessful. It reads: "Harry Drent, a goat hunter, who returned from Guadalupe islands in the schooner Francine, with a load of goat skins, also brought up with him four very rare birds. They are called the Guadalupe carcar, and the species is almost extinct, as only three more are now on the island.

"The way I captured the birds," said Drent today, 'was by a trick I learned while in South Africa. The first bird I winged with a shotgun. I then made him a prisoner, and staked him near a large boulder. I then took a string, fastened it to a stick, and made a loop similar to a cowboy's lariat. I then hid myself behind the rock, knowing the other birds would come to the captive. I threw the rope and captured a second bird. I then made him a prisoner with the other. By this method I secured four out of the seven birds on the island. . . . The birds that I captured are the first of the kind that have been taken alive. I have been offered \$100 for the four, but I will not sell them. I have written the Smithsonian Institute, and am confident I shall secure a high figure. The birds are easily domesticated, but will not allow strangers to go near them. I have them all named, and each one will come to me when called. I feed them raw meat. They have heads similar to those of eagles, the feathers are of a brownish hue and they are about the size of a small eagle.'"

In conversation with me, Ingersoll supplemented the clipping with his personal

recollection of these caracaras. He said that although he understood four birds were brought from the island, there were, when he saw them, only two, of which one was much larger than the other. They had been taken by Drent to a saloon on Fifth Street near G, and at first were in their cage in the back room, but then chicken-wire was put across the show window and the two birds were placed there. They attracted lots of attention and had a peculiar characteristic of lowering the head, something like a Barn Owl, and swinging it from side to side. Thereafter they were taken away from the saloon, on account of their dirty habits, and later on one of the birds escaped and was caught and killed in a chicken coop near the waterfront. The bird was taken to Frank Holzner, who mounted it and had it on exhibition in his taxidermy shop, then on Fifth Street near B. This shop later burned, and the specimen was consumed. Frank Holzner told Ingersoll that of all his possessions he was sorriest to lose the caracara. I have attempted to learn from the San Diego Fire Department the exact date of this fire but find that the records do not go back that far.

If Ingersoll's recollection of the destruction of this specimen and Stephens' recollection of the bird with sewn-on wings are correct, it must have been still a third of Harry Drent's live birds that eventually found its way to Cambridge, Massachusetts—unless there is a possibility that more than one lot of living caracaras was brought from the island.

The history of the two caracaras of Bryant's taking I have learned by correspondence. Through Rudyerd Boulton I am informed that the Field Museum specimen carries three labels: (1) Collection of W. E. Bryant, 1691, female, Guadalupe Island, Jan. 15, 1885; (2) Cory Collection, 6405, same data; (3) Field Museum of Natural History, 75381, same data. This specimen is listed in Bryant's paper on Guadalupe Island (Bull. Calif. Acad. Sci., 2, 1887, p. 283), but is there recorded as a male. Mr. Boulton states, however, that in an author's reprint of the article the sex of specimen 1691 and also some others has been changed in red ink from male to female, the correction having probably been made by Bryant himself. Director W. L. Bryant writes that the Park Museum bird (mounted) was collected by W. E. Bryant on March 16, 1886. It came to Providence with the Manly Hardy collection, and Outram Bangs stated in correspondence that he recollected that Hardy bought it from Charles K. Worthen.

Frank Stephens has kindly written down for me what he knows of the three specimens owned by the San Diego Society of Natural History and their acquisition. His notes are as follows: "About 1888 A. W. Anthony went with me to the Chamber of Commerce and showed me a case of specimens belonging to the San Diego Society of Natural History. Among other specimens were three Guadalupe Caracaras. After the Carnegie library was built, this case, including the caracaras, was moved to the Carnegie library, where it remained several years. After I became secretary of the Natural History Society I took the caracaras home and put them in a case where I could fumigate them. When I gave my collection to the Society in 1910 I moved the lot, including the Society's caracaras, to the Society's Museum in the Hotel Cecil. None of the caracaras had any data. Dr. Palmer lived a year or two in San Diego and we made a collecting trip together in May, 1889. In conversation with Dr. Palmer he told me that he had given the Society the three caracaras. I believe he visited Guadalupe Island but once—in April and May, 1875. Dr. Palmer had been a 'contract' surgeon in the army, but was in private life when I knew him. He sent more or less of his collections, birds and plants, to the National Museum, among them the Guadalupe Caracara from which Robert Ridgway described the new species *lutosus*." I might add that, as a result of the exposure to light result-



ing from the open display of the specimens mentioned by Stephens, they are somewhat faded.

The history of the Palmer-taken caracara now in the American Museum of Natural History is thus given by Stephens: "In the spring of 1877 I visited Mrs. Roberts, then living near National City. She was a nature lover and had quite a number of specimens of various kinds most of which she had gotten together herself, including some mounted birds mounted by herself. Among the birds was the skin of a caracara which she said was collected by Dr. Edward Palmer and given her by him, as was also a Guadalupe Junco. As she did not seem to care much for them, apparently because they were not mounted, I offered to exchange a mounted albino burrowing owl for these two skins. She accepted the offer and I took the skins home with me to Campo, where I was living at the time. The caracara is now in the American Museum, and the junco is in the San Diego Natural History Museum."

A. W. Anthony, who also lives in San Diego, has related to me the circumstances surrounding the capture, on September 20, 1896, of the caracara which bears his label in the Carnegie Museum. He said that this bird was not taken by him personally. He was in a boat anchored off Guadalupe Island and had two assistants, brothers, by the name of Gaylord, who were helping him get natural history specimens. One was collecting botanical specimens particularly, and the other, Horace A. Gaylord, was helping Anthony with bird specimens. They returned from the island with the caracara now in the Carnegie Museum. From what we now know, the species must have been nearing extinction at the time this specimen was secured. Anthony recalls that it was a piece of good luck that the bird was obtained, since Gaylord at first believed he had not hit the bird, as it flew off apparently uninjured. However, after a while it dropped and Gaylord was able to retrieve it.

Gaylord's own entertaining account of the capture was published in the *Nidologist* (iv, January, 1897, pp. 41-43). An excellent list of other bibliographical references relating to the Guadalupe Caracara, including observations of its habits in life, appearance of its eggs, etc., is given by Dr. Grinnell in his "Distributional Summation of the Ornithology of Lower California" (Univ. Calif. Publ. Zool., 32, 1928, p. 113).

The closing chapter of scientific contact with living Guadalupe Caracaras was unwittingly written by Rollo H. Beck. He recently stated in a letter to me: "Although I had no idea of it at the time it seems probable to me that I secured the last of the Guadalupe Caracaras on Guadalupe Island on the afternoon of December 1, 1900. Of 11 birds that flew toward me 9 were secured. The other two were shot at but got away. The 11 birds were all that were seen, but judging by their tameness and the short time that I was on the island I assumed at the time that they must be abundant. All of the skins but one went with my Galapagos material to Lord Rothschild in England. One skin which I kept for a while went finally to the Thayer Museum."

Like Beck, any person could hardly have suspected, upon seeing a flock of 11 of these island caracaras, that they might be the last, or almost the last, of their kind on earth. But history has proved such to be the case. Subsequent collectors have searched in vain for these conspicuous scavenging falcons. As is to be expected, rumors occasionally stir; but, beyond any question of doubt, they are extinct.

*San Diego Society of Natural History, Balboa Park, San Diego, California, September 15, 1932.*



## BIRD REMAINS FROM CAVE DEPOSITS IN NEW MEXICO

By HILDEGARDE HOWARD and ALDEN H. MILLER

In the course of the past three years the authors have been occupied, as time permitted, with the identification of avian remains from cave deposits situated in the Pyramid Peak range at the southern end of the Organ Mountains of Dona Ana County, New Mexico. These bird bones were taken from two localities on opposite slopes of Pyramid Peak, Conkling Cavern on the east and Shelter Cave on the west. Exhumation of the bones began in 1929 and was continued in the summer season of 1930 by parties from the Los Angeles Museum where the material now is deposited.

Up to the time of this writing only four of the species identified from the caves named have received mention in print. Two of these were described as new: *Geococcyx conklingi*, Conkling Road-runner (Howard, Condor, xxxiii, 1931, pp. 206-209), and *Pyelorchampus molothroides*, a cowbird-like icterid (Miller, Auk, XLIX, 1932, pp. 38-41). The other two species, *Cryptoglaux funerea*, Arctic Owl (better known under the common name of the local subspecies, Richardson Owl, which the remains doubtless represent) (See Howard, Condor, xxxiii, 1931, p. 216) and *Gymnogyps californianus*, California Condor (Science News, Science n.s., LXXI, Apr. 4, 1930, p. xiv), both represent considerable extensions of range compared with the known distribution of these species today.

The entire avifauna of the caves, with all possible identifications completed, now amounts to fifty-eight species. It comprises a few extinct forms but chiefly a large group of species still living. Some of this group are not, however, found in the region under present faunal and floral conditions. Pending a fully detailed report upon the birds from these caves, which will appear later in the Los Angeles Museum Publications, it seems desirable to list briefly at this time all species which we have found present. Thus may be placed on record many species heretofore unknown from prehistoric times, as well as additional information relative to changes in distribution.

In the interim since the first of our material was collected, bird remains from a cave in Rocky Arroyo in the Guadalupe Mountains, "about fifty miles by road west and somewhat north of Carlsbad, New Mexico," have been reported by Wetmore (Condor, xxxiii, 1931, pp. 76-77; xxxiv, 1932, pp. 141-42). These remains were associated with bones of extinct mammals such as *Equus fraternus* and *Tetrameryx*, and many of them were found with human materials of the Basket-maker culture. In both Conkling and Shelter caves the bird bones were associated with remains of extinct mammals and part were also associated with evidences of man (human skeletal remains in the former and materials of the Basket-maker culture in the latter). The indications are, therefore, that at least part of the Conkling Cavern and Shelter Cave bones are approximately contemporaneous with those from Rocky Arroyo. It should be of value, then, while presenting a list of species found by ourselves, to include also in the tabulation Wetmore's findings in this third cave only ninety miles east of the Organ Mountains.

| Name   | Conkling<br>Cavern | Shelter<br>Cave | Rocky<br>Arroyo |
|--|--------------------|-----------------|-----------------|
| <i>Branta canadensis</i> , Canada Goose            | X                  | ..              | ..              |
| <i>Anser, albifrons?</i> , White-fronted Goose     | ..                 | X               | ..              |
| <i>Dafla acuta</i> , Pintail                       | ..                 | X               | ..              |
| <i>Nettion carolinense</i> , Green-winged Teal     | ..                 | X               | ..              |
| <i>Cathartes aura</i> , Turkey Vulture             | X                  | X               | X               |
| <i>Coragyps occidentalis</i> , Occidental Vulture  | X                  | ..              | ..              |
| <i>Coragyps atratus</i> , Black Vulture            | ..                 | ..              | X               |
| <i>Gymnogyps californianus</i> , California Condor | X                  | X               | X               |

|  |    |    |    |
|--|----|----|----|
| <i>Accipiter velox</i> , Sharp-shinned Hawk                    | .. | X  | .. |
| <i>Accipiter cooperii</i> , Cooper Hawk                        | .. | .. | X  |
| <i>Buteo borealis</i> , Red-tailed Hawk                        | .. | X  | .. |
| <i>Buteo swainsoni</i> , Swainson Hawk                         | X  | X  | X  |
| * <i>Buteo, albonotatus?</i> , Zone-tailed Hawk                | .. | X  | .. |
| <i>Urubitinga fragilis</i> , Fragile Eagle                     | .. | X  | .. |
| <i>Aquila chrysaetos</i> , Golden Eagle                        | X  | X  | .. |
| <i>Haliaeetus leucocephalus</i> , Bald Eagle                   | X  | .. | .. |
| <i>Polyborus cheriway</i> , Caracara                           | X  | X  | .. |
| <i>Falco mexicanus</i> , Prairie Falcon                        | .. | .. | X  |
| <i>Falco peregrinus</i> , Duck Hawk                            | .. | X  | .. |
| <i>Falco sparverius</i> , Sparrow Hawk                         | X  | X  | .. |
| <i>Tympanuchus pallidicinctus</i> , Prairie Chicken            | .. | .. | X  |
| <i>Centrocercus urophasianus</i> , Sage Hen                    | X  | X  | .. |
| * <i>Callipepla squamata</i> , Scaled Quail                    | .. | X  | .. |
| <i>Lophortyx</i> , sp., Quail                                  | X  | X  | .. |
| <i>Oreortyx picta</i> , Plumed Quail                           | .. | X  | X  |
| <i>Meleagris gallopavo</i> , Turkey                            | X  | X  | X  |
| * <i>Porzana carolina</i> , Sora                               | .. | X  | .. |
| <i>Fulica americana</i> , Coot                                 | .. | X  | .. |
| <i>Larus</i> , sp., Gull                                       | .. | X  | .. |
| <i>Zenaidura macroura</i> , Mourning Dove                      | .. | X  | .. |
| <i>Geococcyx conklingi</i> , Conkling Road-runner              | X  | X  | .. |
| <i>Geococcyx californianus</i> , Road-runner                   | .. | X  | .. |
| <i>Tyto alba</i> , Barn Owl                                    | .. | X  | .. |
| <i>Otus asio</i> , Screech Owl                                 | .. | X  | .. |
| <i>Bubo virginianus</i> , Horned Owl                           | .. | X  | X  |
| <i>Speotyto cunicularia</i> , Burrowing Owl                    | X  | X  | .. |
| <i>Asio wilsonianus?</i> , Long-eared Owl                      | X  | .. | .. |
| <i>Asio flammeus</i> , Short-eared Owl                         | .. | .. | X  |
| * <i>Cryptoglaux funerea</i> , Arctic Owl                      | .. | X  | .. |
| * <i>Cryptoglaux acadica</i> , Saw-whet Owl                    | .. | X  | .. |
| * <i>Aëronautes saxatalis</i> , White-throated Swift           | .. | X  | .. |
| <i>Colaptes cafer</i> , Red-shafted Flicker                    | X  | X  | .. |
| <i>Colaptes</i> , sp., Flicker                                 | .. | .. | X  |
| * <i>Balanosphyra formicivora</i> , Acorn-storing Woodpecker   | .. | X  | .. |
| * <i>Sayornis saya</i> , Say Phoebe                            | .. | X  | .. |
| <i>Otocoris alpestris</i> , Horned Lark                        | X  | X  | .. |
| <i>Pica pica</i> , Magpie                                      | .. | X  | .. |
| <i>Corvus corax</i> , Raven                                    | X  | X  | .. |
| * <i>Cyanocephalus cyanocephalus</i> , Piñon Jay               | X  | X  | .. |
| * <i>Catherpes mexicanus</i> , Cañon Wren                      | .. | X  | .. |
| * <i>Salpinctes obsoletus</i> , Rock Wren                      | .. | X  | .. |
| <i>Toxostoma</i> , sp., Thrasher                               | .. | X  | .. |
| * <i>Oreoscoptes montanus</i> , Sage Thrasher                  | .. | X  | .. |
| <i>Turdus migratorius</i> , Robin                              | X  | X  | .. |
| <i>Sialia</i> , sp., Bluebird                                  | X  | X  | .. |
| <i>Lanius ludovicianus</i> , Loggerhead Shrike                 | .. | X  | .. |
| <i>Xanthocephalus xanthocephalus</i> , Yellow-headed Blackbird | .. | .. | X  |
| <i>Agelaius, phoeniceus?</i> , Red-winged Blackbird            | X  | .. | .. |
| * <i>Molothrus ater</i> , Cowbird                              | .. | X  | .. |
| <i>Pyelorhamphus molothroides</i> , Thick-billed Cowbird       | .. | X  | .. |
| * <i>Carpodacus mexicanus</i> , House Finch                    | X  | X  | .. |
| <i>Pipilo maculatus</i> , Spotted Towhee                       | X  | X  | .. |
| <i>Pipilo fuscus</i> , Brown Towhee                            | .. | X  | .. |
| * <i>Calamospiza melanocorys</i> , Lark Bunting                | .. | X  | .. |
| <i>Amphispiza bilineata</i> , Black-throated Sparrow           | .. | X  | .. |

Fifteen of the species listed above, those marked with asterisks, have never before been identified from prehistoric accumulations. Remains of *Amphispiza bilineata*, although not before so identified, are apparently of such recent entombment as to preclude classification with this group of fifteen. If we hold to that definition of the term fossil which stipulates that the specimen must have come from a geologic horizon earlier than the Recent, we can not positively term members of this group

fossils. The exact age of the two Pyramid Peak caves is as yet undetermined. That they are Quaternary cannot be questioned. But whether late Pleistocene or early Recent is still a matter for consideration. The practical difficulties in delimiting Recent and Pleistocene deposits are often great, since the continuous laying down of materials from Pleistocene through Recent frequently is encountered when there is no evidence as to glaciation or other changes which could serve as guides to age.

In Shelter Cave the dust-like matrix has permitted of no distinction between the earliest and latest deposits except that the evidence of human occupation is confined to the fore part of the cave. In Conkling Cavern, however, the deposits are more or less stratified and there is a definite water-laid stratum separating the upper and lower layers in the cave. We are confident that at least the lower levels at Conkling Cavern are of Pleistocene age, and in all probability some of the remains in Shelter Cave were also laid down during the Pleistocene. However, there is some evidence indicating greater age for Conkling Cavern than for Shelter Cave. This is based upon the occurrence in the former cave of bones of *Coragyps occidentalis* in great numbers, while the modern Turkey Vulture, *Cathartes aura*, is scarce, a condition which is paralleled in the Pleistocene deposits in California. In Shelter Cave, on the other hand, *Coragyps* is absent and *Cathartes* is the abundant form. In the case of the Piñon Jay; *Cyanocephalus cyanocephalus*, listed above, bones have been taken from deep levels in satisfactorily stratified Conkling Cavern deposits, and we are therefore convinced that this species may be added to the list of fossil North American birds.

From among the species in our list that still are living, evidences for changes in distribution should be especially mentioned. The Sage Hen has been recorded from the northern part of the state in earlier years (F. M. Bailey, Birds of New Mexico, 1928, p. 211) but never from southern New Mexico. Its presence in both Pyramid Peak caves is significant in contrast to its absence at Rocky Arroyo. On the other hand, at Rocky Arroyo the Prairie Chicken occurs. This latter species now has become more restricted in its distribution than formerly and is found to the eastward in Texas, although not long ago occurring in the Pecos River Valley of New Mexico. *Cryptoglaux funerea* is not known to occur south of Gunnison County, Colorado, today. The presence of the Plumed Quail, as reported by Wetmore, is important since this quail now extends eastward only as far as western Nevada. Interestingly, his report is confirmed by our identification of bones from Shelter Cave. The Magpie and the Caracara both are forms known today from southern New Mexico on the basis of extremely few records; the former now regularly occurs in northern New Mexico and the latter to the southward in Mexico and Texas.

Out of the entire assemblage of material from the caves, four extinct species have been detected. Two of these, *Geococcyx conklingi* and *Pylorhamphus molothroides*, are peculiar to the cave faunas. The other two, *Coragyps occidentalis*, a vulture, and *Urubitinga fragilis*, an eagle, were first discovered in the Rancho La Brea Pleistocene asphalt deposits of California and later found in similar deposits at Carpinteria, in the same state. This is the first instance of either species occurring outside of California. It is indeed significant to find these extinct raptors ranging eastward in the past; this especially in view of the discovery of *Teratornis*, the gigantic Pleistocene vulture, in Florida (Wetmore, Smithsonian Misc. Coll., 85, no. 2, 1931, p. 26). The California Condor, which appears to be a somewhat more persistent member of the group of large-sized, waning raptors of Rancho La Brea, ranged with *C. occidentalis* and *U. fragilis* into New Mexico. Its appearance in

the three New Mexican caves here discussed is strongly indicative of regular occurrence in this region formerly. It, like *Teratornis*, ranged to Florida in the Pleistocene. We may surmise that many of these large raptors, best known from California Pleistocene asphalt, formerly spread across the southern United States. Possibly only the lack of such suitable traps as the asphalt pits hides from us the knowledge of a once rich falconiform fauna of the eastern United States comparable to that of California.

*Los Angeles Museum, Los Angeles, California, November 7, 1932.*

## FOOD HABITS OF SOUTHERN WISCONSIN RAPTORS

## PART II. HAWKS

By PAUL L. ERRINGTON

The data on hawks to be discussed, like those on owls taken up in Part I (1932b), were gathered with special reference to the relation of hawk species to the Eastern Bobwhite (*Colinus virginianus virginianus*) (1930b, 1931a), as well as from the standpoint of day-by-day food habits. As compared with the owl data, those pertaining to hawks are not so complete for important species and for important seasons, nor are they from sources as satisfactory quantitatively.

Because the efficiency of hawk digestive action may be more than much of the bony material can withstand—notably in the case of buteos and where calcium-hungry juveniles have eaten soft-boned juvenile prey (1930a, 1932a)—and because of the infrequency with which indubitably specific hawk pellets can be collected in numbers (save during the nesting season and sometimes about favorite roosting and feeding places), the pellet analysis method of study has not shown the utility for hawks that it has for owls. In the following discussions, only data from the highest grade of hawk pellets, that is, those with well preserved osseous contents, are used at all and they but sparingly.

"Sign reading" or the ex post facto recording of raptor kills encountered in the field should not be regarded as a proper source of quantitative data, on account of the conspicuousness of certain types of kills (large and medium-sized birds) and the inconspicuousness of other types (small mammals). Sign reading should be used only to detect whether *any* of certain species, such as quail, have been killed and should be used with its short-comings in mind, lest erroneous impressions obscure the true proportions of one prey species to another in raptorial diets.

Eligible for consideration as sources of hawk quantitative data might be mentioned random field observations in which capture or eating of prey was witnessed, prey retrieved from hawks under natural conditions, *fresh* prey from nests and feeding sites, gullet contents from live juveniles, contents of stomachs, and to some extent the comparatively undigested material which occurs now and then in pellets. Of these, gullet contents, procured daily a few weeks to a couple of months from nestlings and tethered young (1932a), have proved especially productive during nesting and post-nesting seasons. Stomachs from taxidermy shops and from hawks shot by the populace and strung up on fences and buildings have also been of value in supplying data otherwise difficult to obtain. These sources are not by any means beyond criticism; each without exception has drawbacks, but imperfect tools are better than none at all.

The accumulated data, mainly from three adjoining counties (Dane, Sauk, and Columbia), represent research in what I would call the major environmental types to be found in southern Wisconsin. The data listed below include none from game farms, or from large commercial poultry raising establishments, and few from other places where unnatural concentrations of more or less handicapped or defenseless species are likely to influence predators into extreme departure from their ordinary food habits.

MARSH HAWK *Circus hudsonius*

Of the data to be presented, those relating to prey retrieved from adult hawks are believed to be of the greatest quantitative importance. Next in order may rank those from gullets (most of mine from juveniles), *stomachs*, *very fresh prey* (not

fur or feathers but meaty remains) from nests or feeding places, and, lastly, bony contents of pellets. Pellet contents, where given, constitute for the most part pre-nesting data or are supplementary to data conspicuously fragmentary. On the whole, my summer marsh hawk pellets, while showing by contained fur, feathers, or scales, the *kinds* of prey eaten, do not show the number of individuals (1930a, 1932a). Therefore, in order that the pellets used may have some value quantitatively, *only* the prey represented by undigested bones will be listed, whatever the weaknesses of this method.

No. 1. *Madison (Wingra Wild Life Refuge)*.—Data from 4 nesting pairs and young:

July, 1929, retrieved from adult hawks: meadow mouse (*Microtus*), 2. Prey seen in possession of adults but not retrieved: small mammal, probably *Microtus*, 7. Bony contents of pellets (Biological Survey analyses): striped ground squirrel (*Citellus tridecemlineatus*), 2; meadow mouse, 22; shrew (*Blarina*), 1; meadowlark, 1.

March 28, 1930, observation: Marsh Hawk feeding on carrion cottontail.

June, 1930, retrieved from adult hawks: juvenile cottontail, 1; striped ground squirrel, 4; meadow mouse, 2; meadowlark, 1. Gullet contents of nestlings: juvenile cottontail, 2; striped ground squirrel, 1; chipmunk (*Tamias*), 1; meadow mouse, 1. Fresh prey from feeding places: striped ground squirrel, 2. Bony contents of pellets (pre-nesting): striped ground squirrel, 2; meadow mouse, 6; small bird, 1.

July, 1930, retrieved from adult hawks: striped ground squirrel, 3. Gullet contents of nestlings: juvenile cottontail, 2; striped ground squirrel, 7; meadow mouse, 1; jumping mouse (*Zapus*), 1; red-winged blackbird, 1; meadowlark, 1; house wren, 1. Fresh prey from feeding place: striped ground squirrel, 1. Bony contents of pellets (post-nesting): meadow mouse, 4; small bird, 1.

June, 1931, retrieved from adults: striped ground squirrel, 2; meadow mouse, 2. Gullet contents of nestlings: juvenile cottontail, 7; striped ground squirrel, 30; chipmunk, 1; meadow mouse, 4; robin, 2; red-winged blackbird, 1; meadowlark, 4; catbird, 1; small bird, 11; frog, 3. Fresh prey from feeding places: striped ground squirrel, 2; red-winged blackbird, 1; small bird, 1.

July, 1931, gullet contents of nestlings: juvenile cottontail, 5; striped ground squirrel, 6; meadow mouse, 2; meadowlark, 2; red-winged blackbird, 1. Stomach contents of 3 young Marsh Hawks killed by a hawk: juvenile cottontail, 1; striped ground squirrel, 3; meadow mouse, 1; shrew (*Blarina*), 1.

No. 2 *Madison (Fish Hatchery Marsh)*.—Data from 7 nesting pairs and young:

July and August, 1929, fresh prey from feeding places: meadow mouse, 4; cowbird, 1. Bony contents of pellets (mostly Biological Survey analyses): striped ground squirrel, 1; meadow mouse, 31; shrew (*Sorex*), 1; meadowlark, 1.

May, 1930, fresh prey from feeding places: meadow mouse, 2.

June, 1930, retrieved from adults: striped ground squirrel, 6; meadow mouse, 3. Gullet contents of nestlings: juvenile cottontail, 4; striped ground squirrel, 11; meadow mouse, 9; vesper sparrow, 1; small bird, 3; frog, 4. Fresh prey from feeding places: juvenile cottontail, 1; striped ground squirrel, 1; grasshopper sparrow, 1.

July, 1930, retrieved from adults: striped ground squirrel, 2. Gullet contents of nestlings: striped ground squirrel, 2; juvenile squirrel (*Sciurus*), 1. Fresh prey from feeding places: juvenile cottontail, 2; striped ground squirrel, 5; field sparrow, 1; young domestic chicken, 1; frog, 1.

June, 1931, prey seen in possession of adults: striped ground squirrel, 3. Gullet contents of nestlings: juvenile cottontail, 3; striped ground squirrel, 18; meadow mouse, 1; meadowlark, 1; flicker, 1; medium-sized unidentified bird, 1; small bird, 3; frog, 1.

July, 1931, gullet contents of nestlings: juvenile cottontail, 3; striped ground squirrel, 10; chipmunk, 1; meadow mouse, 6; deer mouse (*Peromyscus*), 1; bluebird, 1; small bird, 1.

I might list parenthetically the bony contents of pellets gathered during the gullet studies to illustrate the checking of one method against the other: juvenile cottontail, 1; striped ground squirrel, 4; meadow mouse, 4; deer mouse, 2; shrew (*Blarina*), 1; frog, 1. These latter items are not necessarily to be considered as kills separate from the preceding.



No. 3. *North of McFarland*.—Data from a late nesting pair and young: June 14 to July 11, 1930, retrieved from adults: meadow mouse, 1. Gullet contents of nestlings: striped ground squirrel, 3; frog, 4. Fresh prey from nest: frog, 1.

*Miscellaneous quantitative data* from stomachs, observations, etc., for all seasons, 1929-31: juvenile cottontail, 2; striped ground squirrel, 1; meadow mouse, 14; red-winged blackbird, 1; frog, 1.

The 359 kills from the above quantitative sources occur in the proportions of 295 mammals (82.17%), 49 birds (13.65%), and 15 amphibians (4.18%); specifically: juvenile cottontail, 33; ground squirrel, 128; other Sciuridae, 4; mouse (*Microtus* except for a *Zapus* and a *Peromyscus*), 127; shrew (2 *Blarina*, 1 *Sorex*), 3; small and a few medium-sized birds, 48; young domestic chicken, 1; frog, 15.

The cottontails ranged in size from very small individuals up to those a quarter grown, and the ground squirrels from a third grown to adults. Perhaps half of the bird kills were finches and other small birds of the lowlands, most of the rest being fledgling icterids such as meadowlarks and red-winged blackbirds. During the summer relatively helpless immatures comprise the greater part of the diet, the actual proportion of species taken depending upon availability. In 1929, when meadow mice were overrunning south-central Wisconsin, they bore the brunt of Marsh Hawk pressure; the hawks of area no. 3, nesting at the edge of a wet meadow, turned more to frogs. On the other hand, 7 out of 10 pellets gathered in July, 1930, from a Marsh Hawk perch in the extensive Wisconsin River marshy bottoms north of Mazomanie, were made up largely or wholly of small bird remains, simply because birds were more available than rodents in the dense vegetation.

Commonly the Marsh Hawk chooses prey that its weak feet can handle with facility. Quarter-grown cottontails and adult ground squirrels are near the usual upper size limit for mammals; meadowlarks and flickers for birds. The most formidable animal I have ever found at a feeding place was an adult muskrat, and I suspect that this was carrion. The awareness of the old birds of their physical limitations I think is shown by their observed behavior in the presence of large game (1930c). I have seen them ignore full-sized pheasants, sharp-tailed grouse and domestic chickens that happened to be within striking distance. However, on rare occasions surprisingly large prey—such as a half-grown domestic chicken—may be killed, especially by juveniles learning to hunt and driven by hunger or inexperience to chance a struggle for the sake of a meal.

Since the bulk of my data are from June and July, the balance of the year is so badly represented that I can only suggest the general trends of observed food habits for the other months. Marsh Hawks do not ordinarily winter in my observational areas, but they arrive in appreciable numbers about March. Their food from this time until the middle of June seems to be predominantly meadow mice, plus a few small birds. From mid-June to mid-July, the diet runs heavily to ground squirrels, young cottontails and the young of small birds abundant in open grassy habitats. With the cutting of grain and hay fields in July, mice again become available.

Late summer is also a season of increased availability of young poultry and partly grown game birds from which some toll is taken. I have not over-many data for this period, but what I have cause me to doubt that the damage is very serious in localities where "buffer species" are correspondingly available. Personal notes show the occurrence of but one young pheasant and two young chickens on summer feeding places, though reports of depredations are received now and then, dealing mostly with situations where game or poultry is forced to live at a disadvantage.

Pertaining to the relation of Marsh Hawks to wild ducklings, young Prairie Chickens, etc., I have nothing to offer except the comment that on this topic we need



less opinion and more data. The combined technique of gullet examination and tethering of nestling hawks (1932a) worked out by the Wisconsin investigation might be useful to persons desiring to study summer phases of Marsh Hawk food habits on duck or prairie chicken breeding grounds; late broods of Marsh Hawks, properly tethered and tended, might yield quantitative data as far into the summer as the middle of August.

I have as yet no reason to regard the Marsh Hawk as a species, as an important quail enemy, though the evidence is that certain individuals may be. My records reveal 7 quail killed by this raptor, of which three were victims of a single Marsh Hawk during a two-day snow storm when low visibility allowed unusual opportunities for unobserved approach. Of the others, 2 were starving birds. The 331 items representing the quantitative data for no. 1 and no. 2—and these areas, by the way, had been selected for study primarily on account of their high quail populations—certainly have not betrayed any heavy pressure upon bob-white for June and July, nor have the qualitative traces of prey about nests and feeding places. Whether there is or is not a fall leakage of unsophisticated young quail due to Marsh Hawks my data do not say.

All in all, the probabilities of bob-whites falling prey to Marsh Hawks should decrease as the education and development of the former progresses. There might possibly be losses to young birds about the time that their conspicuousness is suddenly enhanced by early snowfalls. Their availability decreases as they become seasoned to winter emergencies, assuming that their environment is suited to them. If they have trouble getting what they need to eat, for example, they may be captured by predators which they, when fit, could elude with ease. Danger-tried vigorous bob-whites living under favorable conditions are nearly proof against diurnal predators by spring.

To summarize the discussion of the Marsh Hawk, it may be said that the food habits of this slow-flying raptor are governed by what small vertebrate prey he finds within range of his long, agile legs. His habit of gliding low over marshes and fields sometimes affords him opportunity to catch speedy, alert birds by surprise, especially where the profile of the vegetation is pitted by openings. Mice, ground squirrels, young rabbits, fledglings of small birds, frogs, etc., are staple Marsh Hawk foods simply because they are easy to find, easy to handle, and are not so adept about getting away.

#### SHARP-SHINNED HAWK *Accipiter velox*

The Wisconsin investigation has almost no data on the food habits of the Sharp-shinned Hawk, with the exception of three 1931 fall stomachs, all of which contained small birds (including a chickadee and an English sparrow). These hawks are frequently seen in migration but they seem to pay most attention to passerines of warbler and finch sizes. Whether the species takes appreciable toll from September and October young quail is a question I cannot answer. I am inclined to think that a grown quail is larger game than a sharp-shin likes to handle, though large sharp-shins ought to be capable of doing anything that some of the smaller Cooper Hawks do.

#### COOPER HAWK *Accipiter cooperii*

Quantitative studies on the year-'round food habits of the Cooper Hawk have been virtually impossible; only for the summer months are my data voluminous enough to have significance, and for these months they are not too plentiful. My best material was procured from the gullets of nestlings and from nests and feeding places

(as fresh, partly eaten specimens). Less reliable from the quantitative standpoint are a number of kills encountered at random in the course of field work, but since Cooper Hawk prey is strongly avian and rather uniformly conspicuous, the recording of these kills should not be quite as inviting to error as for species preying upon mammals.

Not included among the quantitative data are the quail kills discovered while watching the coveys in regular observational areas (1931a, 1931c). These kills were found at times when I was doing little else than ascertaining the mortality of the bob-white alone; hence they could not be used quantitatively without upsetting the actual proportion of one prey to another in the Cooper Hawk's day-by-day diet.

No. 4. *North of Verona*.—Data from late nesting pair and young: July and August, 1930, gullet contents of nestlings: striped ground squirrel, 2; robin, 2; flicker, 4; unidentified small bird, 4. Fresh prey from feeding places (separate from gullet contents): striped ground squirrel, 1; flicker, 1; very small domestic chicken, 1. Material from nestling pellets for days upon which other data were not obtained: chestnut-sided warbler, 1; meadowlark, 1; flicker, 4; small unidentified bird, 2.

The gullet and pellet analyses for this area were made by the Biological Survey. Items possibly represented in two sources of data are listed only in one, to avoid duplications.

No. 5. *North of Pine Bluff*.—Data from nesting pair and young: June and July, 1931, gullet contents of nestlings: striped ground squirrel, 4; red-headed woodpecker, 1; unidentified small bird, 1. Fresh prey from feeding places: robin, 1; song sparrow, 1; bluejay, 3; flicker, 5; red-headed woodpecker, 3; young ruffed grouse, 3; unidentified small bird, 3. No duplications.

No. 6. *West of Pine Bluff*.—Data from nesting pair and young: July, 1931, gullet contents of nestlings: striped ground squirrel, 1; flicker, 1; red-headed woodpecker, 1; unidentified small bird, 3. Fresh prey from feeding places: red-headed woodpecker, 2. No duplications.

*Miscellaneous data*, probably of fair quantitative status, from other nests and from field observations, 1929-31: chipmunk, 1; robin, 1; tree sparrow, 1; English sparrow, 1; flicker, 2; domestic pigeon, 1; mourning dove, 1; ruffed grouse, 1; quail, 1; small unidentified bird, 2.

The Cooper Hawk, like the Marsh Hawk, takes the prey that is most available and which his adaptations fit him for taking. Although his short, rounded wings, long versatile tail and general design for speed and agility allow him no small choice as to quarry, he also turns to the easiest living. Occasional rodents, slow-flying Picidae, robins, small and medium-sized avian immatures make up most of his food in times of plenty; not until fall do my scanty data show the Cooper Hawk preying upon game really worthy of his powers. Out of the 77 examples of quantitative prey, the four that could be expected to give an accipiter something of a chase—domestic pigeon, Mourning Dove, quail, and adult ruffed grouse—were all non-summer kills.

In addition to the types preferred—robins, Red-headed Woodpeckers, and flickers—warblers and finches may be taken at one extreme, and hen pheasants at the other. It was seen in the winter of 1930-31, incidental to following up the fortunes of the bob-white coveys in my observational areas, that the Cooper Hawks were taking advantage of tree sparrow and other small bird populations, possibly subsisting to a large extent upon them.

The three young ruffed grouse of no. 5, brought in on alternate days just before loss of my one tethered juvenile that terminated the studies, arouse the question of how severe a grouse enemy the Cooper Hawk can be. I cannot answer it. Let it be pointed out, however, that ruffed grouse were abundant in the range of wooded hills in which the hawk nest was located, and that a spring fire had destroyed most of

the ground cover in the area. Areas no. 4 and no. 6 had fair and good ruffed grouse populations, respectively, but yielded no evidence of kills.

While the Cooper Hawk is doubtless the most formidable predaceous enemy the quail has (Stoddard, 1931), except when goshawks arrive, my winter, spring, and summer studies indicate that for these seasons damage done to quail may be surprisingly light. Areas no. 4 and no. 6 were in good quail country, as were summer areas elsewhere which were productive of lesser quantitative but some qualitative data, yet no kills were detected. I also had, from December, 1930, to March, 1931, an excellent opportunity to evaluate the depredations of wintering Cooper Hawks on well-censused, fairly heavy quail populations (1931a). The latter suffered a Cooper Hawk mortality of only around 2% for the season. Usually after the sacrifice of a bird or two, the coveys became so hawk-wise that, granted access to correct food and cover combinations, even accipiters found them unprofitable hunting; some coveys, observed to be harassed on occasion, came through the census periods (up to three and one-half months) without loss.

What do Cooper Hawks do in late summer and fall to the season's increase of young quail? Again, I do not know, but I have an idea that they do enough. A great many things happen at this time and leave little concrete evidence as to their magnitude.

#### GOSHAWK *Astur atricapillus*

I have no personal data on the food habits of Goshawks for Wisconsin, though I am familiar with the species from experience elsewhere. From the paucity of accurate information at my disposal I am unable to build up even a probable cross-section of what may constitute the Goshawk's diet on the occasions when he comes down from the north. The opinion held by observant residents qualified to distinguish between hawks is that this species lives largely upon quail and ruffed grouse. This I am not now ready to accept, inasmuch as my recent studies on the Cooper Hawk have profoundly modified and to some extent reversed certain of my former ideas based on second-hand or qualitative data.

I do not question so much what a goshawk *can do* but rather what he actually *does*. What this raptor can do is expressed by Stoddard, who writes me from his notes that the Goshawk invasion of 1907-08 just about wiped out the ruffed grouse of a section north of Prairie du Sac, Wisconsin, he having found grouse kills corresponding to more birds than he had known to be resident in the area. Schorger (1929), relative to the Wingra Wild Life Refuge at Madison, states: "An adult goshawk remained . . . from January 1 to March 5, 1927. On one occasion it was flushed from the skeleton of a rabbit, but its main diet during the above period was bob-white."

It appears very likely that some of the severest consequences of Goshawk pressure upon quail are due to a badly distributed and inadequate supply of quail food or to poor cover or both. This is borne out by the character of all environments in Dane and Columbia counties from which I have received reports of unusual quail mortality during the infrequent "goshawk winters." Further supporting the food-cover hypothesis might be mentioned an out-of-state observation by Prof. H. M. Wight of the University of Michigan; his 1928 notes (unpublished) indicate that a Goshawk got most of a precariously situated covey of eleven quail attempting to winter in an open woodlot southwest of Ann Arbor. I have at present no means of estimating, except by analogy with Cooper Hawks, whether fit quail in a fit environment can cope with Goshawks; that half-starved coveys in brushless woods cannot, I think does not need to be proved.

The Goshawk's speed and strength thoroughly adapt him for his mode of living. A heavy invasion of these raptors such as occurred in 1907 may call for drastic measures if serious losses to gallinaceous game are to be averted, but sporadic appearances of lone individuals hardly justify any great alarm. A certain amount of local damage to ruffed grouse and quail should be offset by the intrinsic ornithological interest of a rare visitor from the wilderness, particularly one we may regard the supreme avian predator of its type.

#### SPARROW HAWK *Falco sparverius*

No. 7. *Northwest of Verona*.—May to July, 1930, material from a nest in a farmyard and from field observations: striped ground squirrel (mouse-size juveniles), 10; meadow mouse, 4; deer mouse (probably *Peromyscus maniculatus bairdii*), 7; English sparrow, 5; incalculable numbers of grasshoppers, June beetles, etc.

From the occurrence of immature ground squirrels of a uniformly small size, as well as the absence of vertebrates much larger, it would seem that these little hawks exercise considerable care not to attack prey beyond their capabilities of handling. The mammals and birds were mostly kills of May and June, insects making up the bulk of the July diet.

#### DUCK HAWK *Falco peregrinus anatum*

No. 8. *Northwest and southwest of Prairie du Sac*.—Material from beneath 3 nests and from sandstone bluff feeding ledges along and to the west of the Wisconsin River: Summers of 1930 and 1931, freshest prey from ledges (some represented only by feathers): red-winged blackbird, 2; bluejay, 2; chimney swift, 1; nighthawk, 1; sparrow hawk, 1; domestic pigeon, 6; mourning dove, 2; green-winged teal, 1. Old bony remains: robin, 2; purple martin, 1; meadowlark, 1; bobolink, 1; bluejay, 8; flicker, 3; yellow-bellied sapsucker, 1; hairy woodpecker, 1; large domestic pigeon, 43; small domestic pigeon and mourning dove (I was unable to separate all of these satisfactorily on the basis of sternal fragments), 23; domestic chicken (part-grown), 4; killdeer, 1; green heron, 1; black tern, 1; horned grebe, 1; unidentified small bird, 7. Other species of which evidence was seen: bluebird, cardinal, whip-poor-will, red-headed woodpecker.

The above data are not to be looked upon as truly quantitative, though I have checked my sources against each other in an effort to arrive at an approximate cross-section of the peregrine's diet. Most of the larger skeletons such as pigeons and domestic chickens were left on the feeding ledges; skulls, mandibles, wings, and other parts of small birds had a way of accumulating on talus slopes beneath. Pellets gave a strong indication of the percentage of lesser avian prey, but I had neither the time nor the skill to conduct in detail such difficult analyses.

Regardless of the deficiencies in the data, it is plain that domestic pigeon is the Prairie du Sac peregrine's main staple. Bluejays, flickers, and icterids figure prominently. Next in order might be considered mourning doves, nighthawks, killdeers, and young domestic chickens. I have record of but the one duck (green-winged teal) from the feeding places, although Wisconsin, of course, is not much of a waterfowl state. Mammals do not seem to be brought in at all.

Various authors cite definite instances of ruffed grouse preyed upon by peregrines, but, while my nests were in excellent ruffed grouse country, I have not found a single trace in bone and feather debris from the Wisconsin falcons. Indeed drumming logs were located within 50 to 150 yards of two of the peregrine nest sites, and I cannot recall a visit at which grouse were not to be flushed. The impunity with which these grouse habitually frequented the vicinity of the peregrine haunts I ascribe to the

entirely different habitats and adaptations of the two birds; the falcon's long pointed wings are ill-designed to whip into the brush in pursuit of a short-winged compact flyer like the ruffed grouse.

Quail populations in the Duck Hawk nesting territories were so sparse that I am not entitled to draw conclusions as to relations between these species.

According to ordinary standards of economic ornithology, the food habits of the peregrine would be difficult to defend, but it is a species of such exceptional esthetic and scientific value (and here I add my futile plea to the futile hundreds or thousands already in print) that we as a public can surely afford to keep the few that we have, especially the ones having food habits no more harmful than those of the Wisconsin birds studied. Pigeons are spoken of as a nuisance by most of the farmers with whom I am acquainted; the rest of the prey is drawn largely from species that plainly thrive in spite of—or perhaps because of—the predator pressure they have always borne. And the Mourning Doves, swifts, nighthawks, martins and teal one might be pardoned for reckoning fair and legitimate game for an aerial hunter equipped only with natural weapons, however superb.

#### AMERICAN ROUGH-LEGGED HAWK *Buteo lagopus s.johannis*

No. 9. *Dane and Columbia Counties*.—Falls of 1929 and 1930, stomach contents of 5 Rough-legged Hawks shot by hunters and farmers: meadow mouse, 8; shrew (*Sorex*), 1; insects, mainly crickets.

#### BROAD-WINGED HAWK *Buteo platypterus*

No. 10. *Madison (Wingra Wild Life Refuge)*.—July, 1929, material from one nest: chipmunk, 1; meadow mouse, 1; shrew (*Blarina*), 4; red-winged blackbird, 1; garter snake, 1; unknown quantities of insects.

#### RED-SHOULDERED HAWK *Buteo lineatus*

No. 11. *North of Mazomanie (along the Wisconsin River bottoms)*.—May, 1930, gullet contents of nestlings: snake, 1; frog, 1. Fresh prey in nest: meadow mouse, 1. Nest litter contained feathers of a red-winged blackbird, considerable quantities of pellet mouse fur, snake scales, and crayfish exoskeletal fragments.

#### RED-TAILED HAWK *Buteo borealis*

The red-tail—and this applies to the other buteos—to me has been anything but an easy species to study. Aside from nest studies and gullet examinations (the period of which was prolonged in 1931 as in the case of the Marsh Hawk by tethering of juveniles), the main sources of data approaching quantitative standards were stomach analyses and field observations, the latter two particularly for late summer, fall, winter, and early spring months.

Stomachs were procurable in varying numbers from hawks sent in to taxidermy shops, or from those shot, in most instances wantonly, by the public. The observational method of study appeared quantitatively sound, provided that the killing or eating of prey was witnessed, and provided that the aim of the observer was to ascertain the typical day-by-day food habits of the raptor. Observations from special viewpoints may be extremely misleading if broad generalizations are drawn from them. Pellets were of negligible utility, for seldom was it possible to collect those which I knew with reasonable certainty to be of red-tail origin (except from nestlings). Then, too, the thoroughness of the red-tail's digestion left little diagnostic bony material in the majority of the castings.

No. 12. *Madison (south of the Fish Hatchery)*.—April and May, 1930, retrieved from adult hawk: striped ground squirrel, 1. Fresh prey from nest: cottontail (incl.



6 juveniles), 9; arboreal squirrel (*Sciurus*), 2; Franklin ground squirrel (*C. franklini*), 3; striped ground squirrel, 11; chipmunk, 2; Norway rat, 1; meadow mouse, 3.

No. 13. *Southwest of Lodi (Crystal Lake)*.—May, 1930, gullet contents of nestling: meadow mouse, 1. Fresh prey from nest: cottontail, 3; arboreal squirrel, 2; striped ground squirrel, 2; meadow mouse, 1; domestic pigeon (young?), 1; bull snake, 1; frog, 1.

No. 14. *Northwest of Verona*.—April and May, 1930, gullet contents of nestling: young domestic chicken, 1. Fresh prey from nest: juvenile cottontail, 1; striped ground squirrel, 17; meadow mouse, 8; young pairie horned lark, 1; young domestic chicken, 3; Florida gallinule, 1; garter snake, 3.

No. 15. *Dane and Sauk Counties*.—April and May, 1930, fresh prey from 5 nests lumped: cottontail, 2; arboreal squirrel, 1; striped ground squirrel, 11; meadow mouse, 1; domestic chicken (one very young and one adult), 2.

No. 16. *North of Middleton*.—May to July, 1931, gullet contents of nestlings: young domestic chicken, 3. Fresh prey at feeding place: chipmunk, 1; young domestic chicken, 1. Bony contents of pellets from tethered juvenile: cottontail, 1; striped ground squirrel, 2; deer mouse, 1; young domestic chicken, 3. No duplications.

I was unable to obtain many real quantitative data on the above nest, but, judging by the masses of feathers always in sight and by the pellets from the youngsters, I feel safe in stating that this family of red-tails lived almost exclusively upon young domestic chickens from the last of April to the forepart of June. From June 8 to about June 20, the diet was cottontail and ground squirrel, with some chicken. From the last third of June to July 9, the pellets of the tethered juvenile showed little except cottontail, ground squirrel, and mouse.

No. 17. *South of South Middleton*.—May to July, 1931, gullet contents of nestlings: arboreal squirrel, 2; striped ground squirrel, 1; young domestic chicken, 1. Fresh prey from feeding place: juvenile cottontail, 1; arboreal squirrel, 4; striped ground squirrel, 2; meadow mouse, 3; young domestic chicken, 2. Bony contents of late pellets from tethered juvenile: cottontail, 1; striped ground squirrel, 2; meadow mouse, 1. No duplications.

The above data, from the most reliable quantitative sources available, are too few to give an unquestionable cross-section of this family's food habits. The ratio of 3 chickens to 17 mammals is higher than that which my notes indicate. For about the first month of the study, evidence was seen of only one chicken at the nest, whereas the large volume of nestling pellet debris was composed of fox squirrel and meadow mouse fur. Chickens occurred most prominently May 21 to June 5, sparingly afterward.

*Miscellaneous data* from south-central Wisconsin, mostly for winters of 1929-30 and 1930-31: Stomach contents of 15 red-tails shot by hunters and farmers: meadow mouse, 12; deer mouse, 2; house mouse, 1; shrew (*Sorex*), 1; adult and young domestic chicken (summer stomachs of birds shot while attacking poultry), 2. Bony contents of the most certain winter red-tail pellets picked up in the field: meadow mouse, 12; deer mouse, 1; shrew (*Blarina*), 5; weasel, 1.

A composite of the red-tail's food habits might be compiled from the 165 individuals of prey tabulated as quantitative data: cottontail (including 8 or more juvenile), 18; arboreal squirrel, 11; Franklin ground squirrel, 3; striped ground squirrel, 49; chipmunk, 3; Norway rat, 1; meadow mouse, 42; deer mouse, 4; house mouse, 1; weasel, 1; shrew (5 *Blarina*, 1 *Sorex*), 6; young horned lark, 1; domestic pigeon (young?), 1; domestic chicken (all young but two), 18; gallinule, 1; snake, 4; frog, 1. In this list the 18 chickens would be likely to provoke the most complaint, though many were of size and breed as to be replaceable for 15 to 25 cents each.

That the red-tail can do damage to barnyard flocks is obvious enough. The amount of the damage varies with the individual hawk and with the degree of exposure of the fowls and their ability to look out for themselves. Old red-tails that distrust man keep away from habitations where most poultry is congregated; these wary ones rarely get chickens except a few that wander far out in coverless fields. Juveniles, awkward hunters, seem to be the boldest raiders, but adults unusually tempted may lose some of their caution.

For all of the disfavor with which the red-tail is viewed by the poultryman, I am coming more and more, for reasons to be touched upon, to regard it as being one of our most valuable wild life species and one having too low a reproductive rate (13 nesting pairs studied in 1930 and 1931 averaged 1.38 young) to hold up under the terrific persecution it receives throughout the United States. I am not advocating a passive tolerance to economic loss from red-tails; I do contend that human headwork can reduce much of the loss by practical and non-lethal means. Is it inconceivable that a property owner or tenant in typical wooded, hilly red-tail country, whose brush-barren poultry range is possessed of isolated trees ideal for hawk look-out perches, could provide a little cover to which chickens could run with some chance of safety? Or that a red-tail may often be taught to stay away from a farmyard by a shot charge that stings and frightens at a hundred yards about as conveniently as it may be killed at thirty?

With far less factual foundation than the poultryman's grievance my data show the sportsman's enmity against the red-tail. The species, handicapped by inherent slowness, does not as a rule catch alert and active prey. Mammals, sluggish poultry, semi-helpless young birds, snakes, all sorts of out-of-condition wild life, and carrion (in winter) fall within the ordinary scope of the red-tail's diet. Mature small birds sometimes taken are flickers and hairy woodpeckers, and my notes mention also a fox sparrow, a meadowlark, and a Baltimore oriole. The speediest birds I have ever known brought to nests were a mourning dove, a quail, and a ruffed grouse; of the circumstances having to do with their demise, I have no knowledge. As a result of my field experience with quail, I would suspect, though, something to be wrong with adult individuals of strong-flying species that let themselves be caught by hawks of the genus *Buteo*.

Two out of the three quail victims personally noted were starving birds; the third was represented in a nest only by feathers, so nothing can be said with respect to its physical condition. The red-tail has been the commonest winter hawk in my observational areas and I have paid special attention to its relation to the bob-white, yet I have never been able to record an example of this raptor taking a quail that was in good shape.

Leopold (1932) fears that winter attendance upon quail coveys even by buteos might prevent their feeding, thus perhaps bringing about weakness contributory to their ultimate capture. My data—insufficient to settle this question, I will admit—are indicative that the quail must be weak or precariously situated in the first place to be harmfully confined to foodless cover by slow predators. Two of my observational coveys (strong birds) that wintered with no loss were known to have the requisite confidence in their physical powers to feed openly in the presence of red-tails, though such behavior seems exceptional.

Could red-tails cause trouble to coveys fit but not having access to good brushy cover? I do not know, but in red-tail hunting territory I have observed coveys wintering under nearly coverless conditions without losses. What part does the red-tail play in the education of the season's young quail, and what summer or fall tribute



does he exact, if any? Once more, I am obliged to say that I don't know; this again leads back to the questions cloaked behind one of the abysmal enigmas of my research—that of bob-white juvenile mortality.

A widely selective preying upon subnormal wild life is hinted at by the visible condition of some Sciuridae taken in April and May, 1930, from red-tail nests. Three out of five arboreal squirrels, two out of two Franklin ground squirrels, and perhaps one-third of 42 striped ground squirrels were conspicuously afflicted with a mange-like skin disease which may have caused them to relax vigilance or may have lowered distinctly their vitality. A fox squirrel found dead in the woods was in a nearly hairless state but bore no marks of violence.

I must confess that the incidence of the above ailment was not checked in anything approximating a scientific manner; I had no idea of the potential significance of what I was stumbling into until toward the end of the red-tail nesting season. The figures pertaining to arboreal squirrels and Franklin ground squirrels were taken from notes; those regarding striped ground squirrels were estimated from memory some months afterward. The few samples of contemporaneous sciurine fauna (striped ground squirrels) I had time to collect were normal in appearance.

The foregoing loose and fragmentary observations on diseased rodent prey of the red-tail are not advanced as proof of anything. At the most they are but indications requiring research to establish their relative values. But whatever they mean or do not mean, they reveal problems that may lead somewhere—problems that may be linked with the very foundation of permanent wild life management.

I have avoided incorporating into this paper my lower grades of hawk food habits data (from juvenile pellets as a whole, old kills, qualitative material from feeding places) except in sections where they might have unusual pertinence. While the data are unevenly distributed for seasons, localities, and for species, they present portions of an ecological story, which though incomplete should be somewhat more sound than vague suppositions or the uninformed opinion of the public.

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*University of Wisconsin, Madison, April 1, 1932.*

## FROM FIELD AND STUDY

**A Young Black Swift.**—On August 10, 1932, a Black Swift (*Nephoecetes niger borealis*) was brought to me. A tourist had found the bird in a meadow between Camp Curry and Happy Isles, Yosemite Valley, California. It was a young bird that had fallen, or had flown too soon, from the nest. The moment I got the bird in my hand I realized that the Black Swift was quite a different bird from the White-throated Swift. The striking difference was in the feet. This Black Swift had the dainty little feet and slender legs of a song bird—the White-throated Swift has mammal-like feet reminding of the fore paws of a chipmunk.

Never before had I had a Black Swift in my hand, but some years ago I had studied one at close range from the egg shell until time of flight. From what I learned in this study I make the guess that the bird when it came to me was about five weeks old. Every feather on its back, tail, wings and crown was daintily tipped with white. The tiny feathers of its crown and forehead, being fringed with white, gave its crown, and especially its forehead, a frosted appearance. Its wings were very long and extended far beyond its short, broad tail as the bird clung to a perpendicular surface. In this position the swift could turn its head half around and look directly backward in the manner of an owl.

Beetling brows, deep-set, shiny black eyes, a sharply hooked dark bill and a proud mien, all helped to give the young Black Swift a predatory cast of features.

When climbing up a sheer surface the swift used its wings, feet, tail and sharply hooked bill. When in repose it lay flat on its belly in the manner of a poor-will. After its breakfast of milk from a medicine dropper it would stand up straight on its legs and teeter its body back and forth as though for exercise. From a dripping faucet it would catch water in its bill and with a flip of the head would sprinkle the water over its body and in this way obtain its morning bath. After shaking out its wet feathers the bird would perch on the edge of a basket and preen. The legs seemed to have swivel joints, and it was strange to see the bird reach up its foot between the body and wing to comb its back and crown feathers.

After preening, the swift exercised its wings, flapping them in a most vigorous manner. Eight days elapsed after the bird came to us before it made its first flight. On this first flight it flew from the edge of its basket to the window screen, a distance of ten feet. When we first got the swift it spent most of its time sleeping. It would sleep the night through in its basket, covered with a linen cloth, and during the first week was content to stay in bed as long as we did. But after its first flight it no longer waited in bed for breakfast. When we got up we would find it clinging to the window screen, looking out on the passing world.

I was in the habit of taking the young swift daily for a turn in the fresh air. It would ride clinging to my shoulder and always seemed to enjoy the outing. Especially did it enjoy a bath in the cloud mist from the lawn sprinkler. After such a bath it would carefully preen its feathers.

The young swift appeared to thrive on the diet of fresh milk which it took from a medicine dropper. Daily it grew stronger, and daily the periods of exercise were more frequent and more extended. On the morning of August 21 the bird left my hand. At first it was wobbly on the wing, but as the wing-beat increased in speed it steadied itself and began to climb. Off it was now for certain. It lifted over the tree-tops; on it went climbing fast and soon was lost to sight in the high skies.—ENID MICHAEL, Yosemite, California, October 5, 1932.

**The Chinese Cormorant on Kodiak Island, Alaska.**—Among a collection of avian bones unearthed in an old Eskimo midden on Kodiak Island by Dr. Ales Hrdlicka, Curator of Physical Anthropology, United States National Museum, in the summer of 1932 is a humerus of the Old World cormorant, *Phalacrocorax carbo*. On the basis of geography this seems referable to the Chinese form, *P. c. sinensis* (Shaw and Nodder) and constitutes the first North American record for that form. It matches exactly in every way a humerus of a Chinese taken specimen.

The normal range of this cormorant is usually stated to extend as far north as northern Japan, but it is highly likely that it not infrequently occurs farther north.

Thus, Dr. Leonhard Stejneger has kindly informed me that in April, 1883, he saw, but was unable to obtain, a cormorant, apparently of this species, on the southeast shore of Bering Island. In his report on the birds of the Commander Islands (U. S. Nat. Mus. Bull. 29, 1885, p. 318) he noted that Pallas (Zoogr. Rosso-Asiat., 2, p. 297) wrote that *P. carbo* was found in Kamchatka, and he (Stejneger) suggested that the "Japanese form may occur on the western shore near the southern extremity of the peninsula." Dr. Stejneger also informs me that Pennant received a list of Kamchatkan birds from Pallas. On going through the literature we find that Pennant (Arctic Zoology, 2, 1785, p. 581) writes that "*Pelecanus carvo*" ranges, "even to Kamtschatka."

It is quite likely, then, that this bird does range north beyond the Japanese Islands, and it is not improbable that the individual here recorded may have struck the westernmost part of the Aleutian chain and followed the course of those islands eastward. A cormorant could readily negotiate the distance involved, especially as it could feed all the way across. Possibly the abundance of other cormorants in the Aleutian Islands might have been a factor in attracting it eastward, once it had gotten as far as the western outliers of that chain.—HERBERT FRIEDMANN, *United States National Museum, Washington, D. C., November 10, 1932.*

**Trapping of Cowbirds and Chats in Alameda County, California.**—On Sunday, June 5, 1932, my son Donald accompanied me on a trip to Irvington, Alameda County, California, to locate the nesting ground of the Long-tailed Chat (*Icteria virens longicauda*). We left our home in Oakland at 6 a. m., arriving at Irvington about an hour later. Leaving our machine where the road ends at the railroad tracks, we walked along the tracks, possibly a mile, before we heard the song of the chat. A close search inside a wire fence among a tangled mass of blackberry vine revealed the chat's nest containing four young birds. We desired to raise two young chats from the nest, but found the birds too young to remove, so we planned to return a few days later after the tail feathers were sprouted.

Returning to the edge of an open field, we saw several Cowbirds (*Molothrus ater*). We decided to make use of our opportunity and, if possible, take a pair home for aviary study. A choice supply of insect life and seed of watergrass was placed in small box cages on the ground in plain view of the birds. About five minutes later a cowbird flew down to the cage and was caught. It proved to be a mature female. We waited for some time in the hope of getting a male cowbird, but other birds kept us busy by insistent visits to our cages. We caught and liberated in quick succession, four Black-headed Grosbeaks, two Mourning Doves, and three Willow Goldfinches.

On Sunday, June 19, another trip was planned for the woods around Irvington. We found our young chats had flown, for we were unable to return as we had planned, a week earlier. However, we were anxious to procure a male cowbird as a mate to the one captured here on June 5. We gave all our attention to this task. We lost no time in placing our small box cages, each containing a tempting meal, in spots where we knew cowbirds were to be found.

It was possibly ten minutes before we heard the clear ringing call note of the cowbirds. They fly swiftly over the fields in a straight line, usually about three feet from the ground. One came on toward us and alighted on a bush only a few feet away. His keen eyesight detected our dangling meal-worms tied in the cage, and down he flew, entering the cage as the door closed behind him. This bird proved to be a fine male, just what we had hoped to procure. Donald went over and removed it from the cage, then events of much interest to us happened in quick succession. As my son walked towards me holding the cowbird in his hand, the bird gave several loud clear calls. Almost immediately cowbirds began to arrive from several directions, lighting in the trees around us, calling incessantly in answer to the newly caught bird. Looking back, I saw another cowbird caught in the cage and two others attacking it from the outside through the wires. Three more cowbirds flew over my head as I ran over to save the second bird captured, from injury, and to drive the others away. This last capture proved to be a female.

In the meantime, the male cowbird responsible for all this commotion was placed on the ground in a cloth covered cage. He was still calling in answer to the cowbirds all around us; he then surprised us by breaking into song. The song imitated closely the sound of water bubbling or gurgling in a brook.

Now that we had three captive cowbirds we decided to move on toward chat territory. About an hour later we heard the chat's song. The chat is shy and retiring but we knew one weakness—he likes spiders. Accordingly we prepared a tempting meal and waited, possibly fifteen minutes, before we caught one, and soon after caught another—two very fine specimens, one mature male chat and a young male, a bird of the season.

The three Cowbirds and the two Long-tailed Chats are now objects of much interest in the aviary, where they remain in the best of health and condition.—JOHN A. BROCK, 5840 Seminary Court, Oakland, California, June 22, 1932.

**The Hawk Owl in Northern Idaho.**—On August 27, 1923, I was walking along the Lolo Trail which follows the divide between the Lochsa River and the North Fork of the Clearwater, Idaho County, Idaho, when what I believe to be a Hawk Owl (*Surnia ulula caparoch*) flew out of a thicket and alighted near the top of a scrubby hemlock within forty feet of me. It took wing again almost immediately, but during the few seconds that it remained I noted the unmistakable round head, particularly as its method of flight had led me to believe it to be some species of hawk.

On November 3, 1925, I collected a young male specimen of Hawk Owl at Stanley Butte, some ten or twelve miles south of the Lochsa River. The August record I present only as a possible indication of the nesting of this bird in northern Idaho. As a bit of corroborative evidence I might mention the fact that before I had shot the November specimen I was positive as to its identity with the bird that I had seen two years previously, even though these two were the only living specimens of the Hawk Owl that I had ever seen.—R. L. HAND, *Avery, Idaho, October 6, 1932.*

**Zonal Range of the Red-breasted Nuthatch in Northwestern Montana.**—The breeding range of the Red-breasted Nuthatch (*Sitta canadensis*) is generally considered to be the Canadian life-zone. The latest A. O. U. Check-list (p. 238) names only this zone in describing the entire geographical breeding range of the species in North America. This limitation to the Canadian zone is concurred in by most references concerning the range of this nuthatch in the Rocky Mountain region. Thus Cary, in his report on the life zones of Wyoming (North American Fauna, no. 42, 1917, p. 44), lists the Red-breasted Nuthatch as a breeding bird only in the Canadian zone. In the adjoining state of Montana, however, according to Saunders (Pacific Coast Avifauna, no. 14, 1921, p. 159), this species "breeds in yellow pine forests in the Transition zone, and is only found in summer where such forests occur."

During the past twelve years I have become quite well acquainted with the habits of the Red-breasted Nuthatch in extreme northwestern Montana. Throughout the country with which I am familiar—which includes nearly all of Lincoln County, the western and northern parts of Flathead County, and portions of the western slope of Glacier National Park—this bird, during the breeding season, ranges from the lowest forested valleys to timberline, nesting regularly in the Transition and Canadian zones, and probably at times in the Hudsonian zone. During spring and summer, individuals may be found locally in every type of coniferous forest occurring within this area.

The birds seem to nest most commonly in Transition-zone woods of western larch and Douglas fir, and in forests containing these two trees with a mixture of western yellow pine or of lodgepole pine. (A census of the breeding birds inhabiting an 80-acre tract of fir-larch-yellow pine woods near Fortine, taken each season during the four years of 1928 to 1931, showed the presence of 11, 9, 14, and 11 pairs, respectively, of Red-breasted Nuthatches.) Less commonly, during the nesting season, these birds regularly inhabit yellow pine forests of the Transition zone; fir-larch-lodgepole pine forests in the lower portions of the Canadian zone; upper Canadian zone woods containing one, two, or all of the last named trees together with alpine fir; and forests of alpine fir and Engelmann spruce in this zone. The preferred Canadian-zone habitat appears to be the basins and valleys at the headwaters of mountain streams, where the spruce-alpine fir type of forest predominates. In this zone the Red-breasted Nuthatch is comparatively rare in forests representing various mixtures of western white pine, western red cedar, grand fir, and western hemlock. It occurs frequently, how-

ever, on open mountain slopes extending from the upper borders of the Canadian zone through the Hudsonian zone to timberline. Although I have not chanced to find a nest of this species within such an area, I have noted young birds not long on the wing in Hudsonian-zone growths of alpine fir, white-bark pine, and Lyall larch.

My observations on the range of the Red-breasted Nuthatch in winter have been limited to Lincoln County; but over the rest of the adjoining area described above its habits are probably similar. In winters when the birds occur as commonly as in summer, they may be found locally in all the forest types which they frequent during the breeding season, showing the same preference for fir-larch woods in the Transition zone and heavily-forested high valleys and basins in the Canadian zone. During winters when most of the nuthatches have migrated from the region, a few remain throughout the season in the Hudsonian and upper Canadian zones, even when they are entirely absent from the Transition and Canadian zone forests of the lower valleys and foothills.—WINTON WEYDEMEYER, *Fortine, Montana, September 19, 1932.*

**Uncommon Winter Birds at Davis, California, in 1932.**—The severe winter weather early in 1932 brought several uncommon bird visitants to the "plains" of the Sacramento Valley. On February 13, Mr. Leo K. Wilson saw a dozen or more Western Evening Grosbeaks (*Hesperiphona vespertina brooksi*) in trees along Putah Creek at Davis. On February 16, I saw five in almond trees in town and they were present in the same location at least until March 7; I also saw a group of eight on the University Farm on April 4, and one bird was heard there on April 7. Mr. J. A. Neff reported the species as present in Marysville for a month up to March 14, and on March 30 he saw about twenty in Woodland, feeding on seeds of elm trees about the County Building. Dr. H. Gibbons reported them in his garden at Sacramento late in March. A flock was reported feeding on almond buds at Dunnigan, Yolo County, whence I received a specimen shot on March 26. These scattered observations suggest that the species was present over a considerable area during the late winter and early spring season.

On March 5 I watched a group of at least eight of the grosbeaks, including both sexes, which were feeding on the blossoms of soft-shelled almonds along A Street in Davis. The trees were at, or a little past, the peak of blossoming. The birds were biting in at the bases of the blossoms and eating out the then small ovaries. On the sidewalk below the trees were many dropped blossoms each of which had a cut near the base of the corolla where a grosbeak had extracted the favored food item. Despite the fact that the birds were busy in these trees for several days and a multitude of blossoms was removed, a fair crop of nuts resulted. Some almonds of the previous year's crop remained on the trees and a few of these were being eaten as well. Later, grosbeaks were present in an orchard of seedling almonds on University land opposite my home but I could not be certain that they used these trees other than for perching.

Cedar Waxwings are of fairly regular occurrence at Davis in winter, but more than the usual numbers were present early in 1932. On January 17, a flock of about twenty Cedar Waxwings came into a tree in our home garden and among them I detected one Bohemian Waxwing (*Bombycilla garrula pallidiceps*). Scrutiny of flocks of the more common species, in nine years of residence at Davis, has not revealed any other individual of the Bohemian.

The first local record for the Band-tailed Pigeon (*Columba fasciata fasciata*) was of a bird picked up dead just southeast of Davis on January 13 this year by Mr. W. Warner Wilson. On February 14, Mr. Leo K. Wilson and I saw at least six of these pigeons along Putah Creek, just south of the University Farm. Mr. Wilson told me this is the first season the birds have occurred here within his recollection. A week previously pigeons to the number of more than six hundred were observed in trees on ranches west of the University Farm by Mrs. W. W. Wilson; some were feeding in fields being seeded to barley. Mrs. Frank Campbell reported them as still present on March 2.

The California Purple Finch (*Carpodacus purpureus californicus*) has been noted here in winter a few times during the past decade, but this last winter the species was more common and more widespread than usual. My first record was on January 17 when four adults were feeding on buds of a Tilton apricot and later on berries of *Pyracantha coccinea* scattered on the ground at my home. A small band stayed about



the garden for a number of days feeding on buds and berries; and on February 7, while I was pruning a Blenheim apricot tree, the birds came into the tree to forage and they also took buds from branches already cut and lying on the ground. Many were seen feeding with Brewer Blackbirds in barnyard litter under some oaks along Putah Creek on February 14. The species was last recorded on April 7.

Two other winter visitants, usually of scarce occurrence, were more in evidence. Varied Thrushes (*Ixoreus naevius* ssp.) are represented at Davis almost every winter by a few individuals which ordinarily remain in the vicinity of fairly dense tree growths; the species was more common this year, and one or more individuals was noted out in the open in trees and shrubs along a well traveled street. The Townsend Solitaire (*Myadestes townsendi*) was noted on several dates between January 31 and March 7 in locations suggesting that several individuals were present.

A conspicuously large congregation of Western Robins (*Turdus migratorius propinquus*) on the University Farm this past winter has already been recorded (The Gull, vol. 14, no. 5, May, 1932, pp. 1-2).—TRACY I. STORER, *Division of Zoology, University Farm, Davis, California, October 18, 1932.*

**California Quail Attacked by Gopher Snake.**—On July 9, 1932, in the Rockridge district, Oakland, Alameda County, California, a California Quail (*Lophortyx californica*) was heard calling in distress by three members of my family. The bird, a female, was located at its nest beneath a bush. It was thrashing about on the ground, while its throat was held fast in the jaws of a good-sized gopher snake. When the snake was struck it released its hold upon the quail and turned its attention to the eggs. The snake swallowed one egg and was undisturbed until the egg had progressed about six inches from its mouth. It was then chased away from the remaining eggs. —MARGARET W. WYTHE, *Museum of Vertebrate Zoology, Berkeley, California, October 18, 1932.*

**White-crowned Sparrows Banded in Pasadena.**—Because *Zonotrichia leucophrys leucophrys* is rather a rare bird in Pasadena it may be of interest to publish the records of those banded by us at 418 North Hudson Avenue, Pasadena, California.

| Band numbers | Dates of captures | Band numbers | Dates of captures         |
|--------------|-------------------|--------------|---------------------------|
| 570464       | April 18, 1928    | A131477      | April 29, 30, May 1, 1930 |
| 570479       | April 19, 1928    | B111924      | April 27, 1931            |
| 570484       | May 11, 12, 1928  | C103071      | May 11, 1932              |
| 694402       | April 18, 1929    | C103100      | May 29, 1932              |

These birds were all in their adult plumage and presumably were on their northward migration at the time of capture. None, other than those captured, has been seen at this location.—HAROLD MICHENER and JOSEPHINE R. MICHENER, *Pasadena, California, October 31, 1932.*

**The Lucas Auk of California.**—Dr. U. S. Grant of the Geology Department of the University of California at Los Angeles, on his return from field work on the Marine Pliocene at San Diego, California, placed in my hands a small fragment of bone which proves to be of more than passing interest. In 1902, Lucas (Proc. U. S. Nat. Mus., xxiv, 1902, pp. 133-134) described the first fossil bird recorded from the state of California. This specimen was taken during the construction of the Third Street Tunnel in the business district of Los Angeles, and was limited to the proximal three-fourths of the humerus, evidently of a marine diver. Lucas established for the bird a new genus and species, *Mancalla californiensis*, a category which has stood for thirty years without an additional representative. The imperfect fragment at present in hand is so completely in harmony with the type specimen in the characters preserved that I have no hesitation in announcing it as basis of the second record of the species.

At the time of original description, the age of the formation penetrated by the tunnel was considered to be Upper Miocene. Four years later Arnold (U. S. Geol. Surv., Prof. Paper no. 47, 1906, p. 29) revised the geologic correlation on the basis of molluscan remains, and assigned it to a later time, that of Lower or Middle Pliocene. The specimen in hand comes from the Pliocene of San Diego and thus strengthens the opinion of Arnold.



Furthermore, Dr. Grant, studying the invertebrate fauna at the San Diego locality, concludes the age to be the middle part of the Pliocene. He has kindly furnished the following note on his field station in the horizon.

"The specimen of bird bone you have identified as *Mancalla californiensis* Lucas was collected by Mr. E. H. Quayle from very fine grained, gray sandstone in a road cut about one-tenth mile east of Euclid Avenue on Market Street, San Diego. The occurrence is far from the base of the San Diego formation, and almost surely in the upper half of it. Concerning possible breeding islands at that time, it would be safe to say that in all probability Pt. Loma and Soledad Hill were such islands in Pliocene time, and there were possibly others in the present foothill area."

Lucas' original paper states that the genus *Mancalla* is characterized by a short, flattened humerus devoid of the customary sigmoid flexure, by the moving of the articular head toward the ulnar border, and by the development of the ridge for the attachment of the brachialis inferior muscle. He bases his conclusion of flightless habit upon the shortness, the flatness, the lack of sigmoid flexure of the shaft, and the backward thrust of the articular head. Lucas' points are well taken, and anyone making a careful study of the type is impressed with the weakness of the bone as an organ of flight. While it does not show genetic relation to the penguins, there are certain characters, presumably adaptive, that are strongly suggestive of that group, and which at the same time set it off from its nearest relatives, the Auks. Such characters may be listed as follows:

- 1.—A short, thin, almost blade-like form strongly flexed into an open arc instead of a sigmoidal curve.

- 2.—This arc is accentuated by the backward thrust of the deltoid crest beyond the middle point of the shaft where it becomes even carinate in form.

- 3.—The ligamental furrow on the head assumes a deep basin shape, and lies just opposite the capital groove with which it communicates by way of a notch in the posterior contour of the head. This notch is very deep in both specimens.

- 4.—The sub-trochanteric fossa is much larger than in the Great Auk, though smaller than in the penguins.

- 5.—The brachialis anticus muscle attached to a ridge that lies almost on the very profile of the flattened shaft.

The Great Auk (*Plautus impennis*) was known to be flightless, though the wings were doubtless used with good effect in underwater swimming.

The Pliocene bird was held by Lucas to have been of greater specialization than the Great Auk and hence the humerus was of smaller size in relation to the body mass. He therefore estimates for *Mancalla* a body size about equal to that of *Plautus impennis*. With this conclusion, I am quite in accord.

Lucas further postulates for the species an insular breeding ground, protecting it from certain mammalian predators. For some years the general area of the present city of Los Angeles, in my own thinking and speaking, has been designated as a Pliocene archipelago. Perhaps the present bay of San Diego is the residuum of another Pliocene sea that was broken by islands comparable to the Los Angeles archipelago and afforded to *Mancalla californiensis* a haven comparable to Funk Island. No ice floes made pathway for fox or wolverine, and no poultry-minded whaler landed there to vary the monotony of his diet and herd the helpless creatures across the gangplank onto his boat's deck. Yet *Mancalla* "walked the plank" into oblivion just as certainly as did the Great Auk of Recent time.—LOYE MILLER, *University of California at Los Angeles*, October 13, 1932.

**Occurrence of the White-winged Scoter in Montana.**—On June 7, 1932, a White-winged Scoter (*Melanitta deglandi*) was observed by the writer at Black Lake, near Fortine, in extreme northwestern Montana. The bird, evidently a wanderer, was not observed at that lake, or any other lake in the locality, at any other time during the season.

There appear to be no published records of the occurrence of this species in Montana during spring or early summer. In his list of Montana birds (Pacific Coast Avifauna, no. 14, 1921, p. 39), Saunders cites a few described cases of its occurrence as a fall migrant, principally during August, with the statement that these are the only Montana records.—WINTON WEYDEMEYER, *Fortine, Montana*, September 19, 1932.

**Summer Occurrence of the Goshawk in Idaho.**—In the 1931 edition of the A. O. U. Check-list I note that Idaho is not mentioned in the ranges given for either form of the Goshawk, *Astur atricapillus atricapillus* or *A. a. striatulus*. In the Clearwater Mountains of the St. Joe and Little North Fork drainages I find that the occurrence of one of the two forms during the summer months is usual enough to give fair evidence of the probability of their breeding in this locality. On July 27, 1930, I shot an immature male which I took to be the western form, and the following sight records have been noted by me during the summer months: July 6, 1921, one; June 6, 1922, one; July 27, 1930, two, one collected; July 28 to August 13, 1930, one seen every few days; July 27, 1931, two; August 8, 1932, two; August 10, 1932, one; August 20, 1932, two. During September and October the Goshawk is usually one of the commonest hawks in the heavily timbered areas, and it is usually present to some extent throughout the winter.—R. L. HAND, *Avery, Idaho, October 6, 1932.*

**Burrowing Owls Occupying Unusual Quarters.**—Near Dixon, Solano County, California, on October 15, 1932, I found Burrowing Owls (*Speotyto cunicularia hypugaea*) occupying holes other than the usual underground quarters.

Much of the hay in that section had been cut and raked into small piles averaging some three feet in height, and the piles had been left in more or less regular rows throughout the fields. In one field which I visited, I frightened a Burrowing Owl from the ground at the base of a hay pile, and about an hour later, as I approached another pile of hay in an adjoining field, another owl flew up from its base. Prompted by the fact that each of these birds had scolded me for disturbing them, I investigated the points from which they had flown and found that they were both occupying holes which had been burrowed into the hay. Jack rabbits were present in good numbers, and while many of their shelters were simply forms in the hay, others were holes neatly rounded out by gnawing and digging to a depth of two or three feet into the bases of the piles. Two of these well-formed holes the owls were using for quarters.

About the entrances was the usual accumulation of pellets, excrement and a few feathers which had been shed by the owls. I dug into the hay at each of the holes and found in the slightly enlarged chambers at the ends of the burrows, similar evidences of occupancy such as were scattered about the ground outside the entrances. There was no evidence that the burrows had been used for nesting last spring, it being doubtful if the hay had been harvested and burrows made that early in the season. Quite likely, too, the hay piles will have been used as forage by stock prior to the next nesting season. If left intact for a sufficient period I see no reason why these hay homes would not serve satisfactorily as breeding quarters.

The pellets in and outside the cavities consisted primarily of the remains of Jerusalem crickets (*Stenopelmatus*).

Such quarters as these in the clean, dry hay, it would seem, should prove to be more attractive and comfortable than the usual subterranean domiciles.—EMERSON A. STONER, *Benicia, California, October 26, 1932.*

**Distributional Notes from the Northwest Coast District of California.**—During the summer season of 1932 I have twice had occasion to make brief collecting trips into the northwest coast redwood belt of California. Observations of certain species of birds, either while en route or in camp, prove to constitute additions to the knowledge of avian distribution in that region.

Of minor importance are the observations of Pygmy Nuthatches and a Crossbill in the vicinity of Fort Bragg, Mendocino County. Pygmy Nuthatches (*Sitta pygmaea pygmaea*) were noted three miles southwest of Fort Bragg on August 27. The previously recognized northern limit for this nuthatch on the coast was at Mendocino City, about eight miles to the southward (Grinnell, *Pacific Coast Avifauna*, no. 11, 1915, p. 162). The nuthatches evidently range continuously through the coastal forest of Bishop pine (*Pinus muricata*) and doubtless follow this favored forest tree north of Fort Bragg as far as Inglenook, the northern limit of Bishop pine on this section of the coast. On the same day, inland, fourteen miles southwest of Fort Bragg, a Crossbill (*Loxia curvirostra* ssp.) was noted in open Douglas fir timber in a region formerly forested with redwoods. Records appear to be few for this nomadic species in this part of the state.

On May 26 a breeding male Hermit Warbler (*Dendroica occidentalis*) was collected ten miles north of Garberville, elevation 1000 feet, on the south fork of the Eel River, Humboldt County. This male, number 1268, coll. A. H. Miller, and one or two others were stationed as for breeding in small isolated groves of yellow pines amid Douglas fir and madrone and across cañon from an extensive redwood forest. The bird collected was singing continuously in a restricted area; its gonads were greatly enlarged. This breeding station is thirty-five miles west of the Yolla Bolly Mountains and a similar distance south and west of South Fork Mountain, Trinity County, where Hermit Warblers have previously been found breeding in the yellow pine forests (specimens in the Museum of Vertebrate Zoology). It is significant to note this species following the yellow pines to low elevations and into a region close to the coast and forested primarily with redwood.

The California Shrike (*Lanius ludovicianus gambeli*) is a permanent resident in parts of southern and interior Sonoma County, as for example at Valley Ford, Bodega and Santa Rosa. It has not been known heretofore from farther north on the California coast, except for Townsend's report (Proc. U. S. Nat. Mus., 10, 1887, p. 222) of occurrence in December of 1885 at Humboldt Bay. This indefinite and somewhat unsatisfactory record, if it applies to this form, probably represents a single stray bird. On August 26 of this year I watched a California Shrike for several minutes while it perched at close range on a wire over a farmyard, one and a half miles south of the mouth of the Gualala River in extreme northwestern Sonoma County. It was a very dark-colored individual, both above and below. At this locality there is a narrow coastal plain that is free from forest. This bird may represent a post-breeding season dispersal that often occurs in August in this species; yet it is not impossible that occasional pairs of shrikes breed here, as this coastal plain, though narrow and restricted by forests, is not entirely cut off from similar shrike-inhabited country near Bodega, thirty-five miles to the southwest.

The observation of a Road-runner (*Geococcyx californianus*) on August 27 on the Navarro River, central Mendocino County, ten miles from the coast, occasioned considerable surprise in my mind at the time, since the bird was flushed from roadside cover in a fairly dense forest of redwood and Douglas fir. The key to its appearance here probably lay in the presence, a few hundred yards above the forest, of a brushy, lumbered hillside dotted with low stump sprouts of the redwoods. Grinnell (Condor, IX, 1907, pp. 51-53, map) reviewed the distribution of Road-runners in California and showed that the known northern limit of the species in the coastal area was at Sebastopol, Sonoma County (Belding, Land Birds Pac. Dist., 1890, p. 56). No published records since then have extended the known range in this sector. The Navarro River is sixty-five miles in an air line northwest of Sebastopol. Upon searching through the notebook of Dr. W. P. Taylor, written while in the field for the Museum of Vertebrate Zoology in 1913, I find that when his party was stationed at the mouth of the Gualala River, extreme southern Mendocino County, residents there told him that Road-runners occurred in that vicinity. Further, while at Covelo, Mendocino County, Taylor learned through similar sources of Road-runners occurring "not far below Willits," Mendocino County. In view of this information in connection with my recent observation, it seems proper to conclude that Road-runners occur regularly, though doubtless in small numbers, northward well into Mendocino County, on suitable brush covered tracts of land.—ALDEN H. MILLER, Museum of Vertebrate Zoology, Berkeley, California, September 9, 1932.

The California Condor in Texas\*.—Among some avian bones collected, together with prehistoric human cultural remains, in a cave on the south peak of Mule Ears Peaks, ten miles north of the Rio Grande in Brewster County, Texas (approximately 29°10' n. lat., 103°25' w. long.), by Mr. F. M. Setzler, Assistant Curator of Archeology, United States National Museum, during the spring of 1932, are twenty-seven bones and fragments of bones of the California Condor, *Gymnogyps californianus*. These represent at least three individuals and possibly more. The best preserved specimens are four tarso-metatarsi, three of which are in perfect condition while one lacks the upper articular surface. One toe phalanx is also in practically perfect condition, but the other bones are fragmentary; they include the following: three humeri, two femora, three ulnae, two coracoids, six tibiotarsi, one pair of clavicles, one radius, one

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metacarpal, and three fragments of long bones (possibly tibiotarsi). One metatarsus is from a young bird barely old enough to fly—indication that condors nested in this vicinity. The age of the deposit is estimated from the archeological remains at from 1500 to 3000 years. Mr. Setzler informs us that there was another, but inaccessible, cave one hundred or more feet above the one that yielded these bones, and that it appeared to contain an extensive deposit also; it is quite likely that it may eventually be found to contain more condor material.

The present record is another link in the evidence of the transcontinental range of the condor in ancient times. Known at present in the living state only from the mountains of southern California and northwestern Lower California, it has been recorded on the basis of two fragmentary osseous remains from a cave fifty miles west and somewhat north of Carlsbad, New Mexico, by Wetmore (Condor, XXXIII, 1931, pp. 76-77), from Conkling Cavern, New Mexico, by Howard (Science, April 4, 1930, p. xiv), from Gypsum Cave, near Las Vegas, Nevada, by Miller (Condor, XXXIII, 1931, p. 32), and recently by Wetmore (Smiths. Misc. Coll., vol. 85, no. 2, 1931, pp. 25-26) in fossilized condition from Pleistocene deposits in Florida (Hog Creek near Sarasota, and the Seminole area). The present lot of bones comprises the first indication of the former existence of this bird in Texas, and it is the largest number of specimens yet taken anywhere outside of the present range of the living bird. The abundance of the bones clearly indicates that the species was no mere incidental visitor in the big bend region of Texas a couple of thousand years ago.

With these bones were found a sternum of the bobwhite, *Colinus virginianus*, a broken humerus of the caracara, *Polyborus cheriway*, a fragment of a tibiotarsus of the great horned owl, *Bubo virginianus*, and a flank feather of the last species.—ALEXANDER WETMORE and HERBERT FRIEDMANN, U. S. National Museum, Washington, D. C., November 23, 1932.

**A Way to Distinguish Young Buffle-head Ducks from Young Golden-eye Ducks.**—Groups of young ducks are observed commonly to be composed rather indiscriminately of birds from more than one nest or even to include more than one species. This habit necessitates more than usual caution in identifying certain kinds of ducklings. The close relationship of the buffle-head and golden-eye ducks is known to be reflected in close similarity of young in down and is likely to result in confusion in attempts to identify specimens of downy young unless some sure way of distinguishing them is known. This is especially true in regions where two species of the group are known to nest. For example, now that both the Buffle-head (*Charitonetta albeola*) and the Barrow Golden-eye (*Glaucionetta islandica*) are known to nest in California, it is desirable that a way be known by which the downy young of these species could be identified. Such knowledge would make it possible to make determinations more certain in instances where opportunity may come for handling the young ducks.

Concerning the young in down of the buffle-head, Phillips (A Natural History of the Ducks, 1925, III, p. 335) wrote as follows: "I cannot see any difference between the young of this species and the Golden-eye except, of course, that at similar ages the Golden-eye is much the larger. Millais speaks of a difference in the shape of the white patch on the 'sides' but I fail to detect any in the very large series now before me."

Brooks (Auk, XXXVII, 1920, p. 363) has pointed out features of size and shape of nail on the bill useful as aids in distinguishing various adult stages of the American Golden-eye (*Glaucionetta clangula americana*) from corresponding stages of the Barrow Golden-eye. However, I do not know that this character has been used to separate the downy young of either of these species from the young of the buffle-head.

A casual examination of adult birds of both sexes shows that the nail on the bill of the buffle-head is relatively, as well as actually, much smaller than the nail of the Barrow Golden-eye. Furthermore, this difference applies to young birds in down just as well as to adults. The tabulation given below shows the measurements of length of culmen and length of nail in four adult males and three adult females of Barrow Golden-eye and an equal number of buffle-heads from the Museum of Vertebrate Zoology, as well as of all the available specimens of young of both species. Also, the ratio between these measurements is shown for each specimen and the average for each sex. Weights of the young individuals are given as indicators of sizes and ages.

## MEASUREMENTS IN MILLIMETERS OF CULMEN AND NAIL AND RATIOS BETWEEN THEM IN BARROW GOLDEN-EYES

| Sex and age | Specimen number | Weight (grams) | Length of culmen | Length of nail | Ratio of nail to culmen |
|-------------|-----------------|----------------|------------------|----------------|-------------------------|
| Male ad.    | 41835           | .....          | 33.0             | 13.8           | .42                     |
| Male ad.    | 41836           | .....          | 34.4             | 13.4           | .40                     |
| Male ad.    | 44637           | .....          | 35.8             | 13.5           | .38                     |
| Male ad.    | 50692           | .....          | 34.4             | 13.6           | .39                     |
|             |                 | Average        | 34.4             | 13.6           |                         |
| Female ad.  | 50603           | .....          | 30.8             | 11.2           | .36                     |
| Female ad.  | 39707           | .....          | 33.2             | 11.7           | .35                     |
| Female ad.  | 43997           | .....          | 29.7             | 11.2           | .38                     |
|             |                 | Average        | 31.2             | 11.4           | .36                     |
| Male yg.    | 44642           | 360            | 22.5             | 8              | .35                     |
| Female yg.  | 44641           | 316            | 22.8             | 8.2            | .36                     |
| Male yg.    | 44640           | 201            | 19.1             | 7.1            | .37                     |
| Male yg.    | 44639           | 175            | 17.3             | 7.0            | .40                     |
| Female yg.  | 44638           | 165            | 18.3             | 7.2            | .39                     |
| Female yg.  | 44629           | 43             | 12.7             | 5.2            | .41                     |

## MEASUREMENTS IN MILLIMETERS OF CULMEN AND NAIL AND RATIOS BETWEEN THEM IN BUFFLE-HEADS

| Sex and age | Specimen number | Weight (grams) | Length of culmen | Length of nail | Ratio of nail to culmen |
|-------------|-----------------|----------------|------------------|----------------|-------------------------|
| Male ad.    | 4843            | .....          | 26.5             | 7.0            | .26                     |
| Male ad.    | 24638           | .....          | 25.4             | 7.1            | .28                     |
| Male ad.    | 56339           | .....          | 28.6             | 6.5            | .23                     |
| Male ad.    | 29598           | 404            | 26.2             | 7.3            | .28                     |
|             |                 | Average        | 26.7             | 7.0            | .26                     |
| Female ad.  | 4844            | .....          | 24.4             | 6.1            | .25                     |
| Female ad.  | 70              | .....          | 24.1             | 6.3            | .26                     |
| Female ad.  | 45069           | .....          | 21.5             | 5.8            | .27                     |
|             |                 | Average        | 23.3             | 6.1            | .26                     |
| Male yg.    | 45963           | 170            | 18.3             | 4.9            | .27                     |
| Male yg.    | 45961           | 168            | 17.9             | 4.9            | .27                     |
| Male yg.    | 45960           | 163            | 17.9             | 5.0            | .28                     |

The measurements listed above show that the difference between adults of these two kinds of ducks in size of nail as indicated by its linear dimension also serves to distinguish the young. The smallest individual of downy young Barrow Golden-eye has a larger nail than a buffle-head of four times its weight. The ratio of length of nail to length of culmen changes scarcely at all with increase in size and age. Moreover, this ratio appears to be fairly constant for each species, but the difference between them is relatively great. The simple determination of ratio of length of nail to length of culmen seems to provide a certain means of distinguishing downy young of these two kinds of ducks at any age.—JEAN M. LINSDALE, *Museum of Vertebrate Zoology, Berkeley, California, January 3, 1933.*

A Long-lived Wren-tit.—In a previous issue of *The Condor* (XXXIII, May, 1931, p. 128) I told of the capture of an Intermediate Wren-tit (Gambel's Wren-tit by the new A. O. U. Check-list), *Chamaea fasciata fasciata*, bearing band number 91519. This bird had been banded in Strawberry Cañon, Berkeley, on March 22, 1925, by E. D. Clabaugh, and was recaptured by me February 3, 1931. It repeated six times in February and once in March of the same year. It returned on February 27, 1932, and again on December 3, 1932, each time within a few hundred feet of the location where Mr. Clabaugh first trapped it. As this bird could not have been hatched later than June, 1924, it must have been at least eight and one-half years old when last recaptured.—E. L. SUMNER, SR., *Berkeley, California, December 7, 1932.*

Off-shore Migrants over the Pacific.—The Templeton Crocker Expedition of the California Academy of Sciences sailed from San Francisco on the yacht *Zaca* on March 10, 1932, returning to the same port on September 1 following. As ornithologist of the expedition I was occupied with bird collecting and observation wherever possible. The most important ornithological work was accomplished at our southernmost objective, the Galapagos Archipelago, but worthwhile observations were made also on our way along the western coast of Mexico. In particular, migrating North American species were seen at various times and places on the Galapagos and elsewhere, deserving of explicit record other than as part of a general account of the birds of the Galapagos Islands.

Mr. Crocker himself, personally conducting the expedition, took a most lively interest in the bird work. He shot most of the specimens that I prepared, leaving me happily free in my field work to follow such special lines of inquiry as seemed desirable. A large proportion of the following records are results of his activity.



Guadalupe Island, Mexico. I was ashore at Northeast Anchorage, March 16, at Melpomene Cove, March 17; I did not reach the pine and cypress groves of the higher sections. At Northeast Cove three species of birds were present in abundance, House Finch (*Carpodacus amplus*), Junco (*Junco insularis*), and Rock Wren (*Salpinctes guadeloupensis*). It seems to me that the abundance of the Junco at sea level is worthy of note, for, as I obtained a young bird that could barely fly, Juncos must have been nesting there. At the time of our visit the ground was covered thickly with green grass and clovers. The Juncos were in the grass or skulking under huge boulders, like Rock Wrens. One Lincoln Sparrow (*Melospiza lincolni*) was collected. The barren, rocky mesa back of Melpomene Cove was not so good a place for birds. A few House Finches and Rock Wrens were there but no Juncos. A Burrowing Owl (*Speotyto cunicularia hypugaea*) was seen at the entrance of its burrow in the wall of a shallow gully, wherein the bird retired not to re-appear. Pellets picked up, recently disgorged, were formed apparently altogether of chitinous insect remains. A Red-tailed Hawk (*Buteo borealis calurus*) soared overhead, pursued by two Sparrow Hawks (*Falco sparverius phalaena*).

Sulphur Bay, Clarion Island, Mexico, March 24. The resident species here were indifferent to approach, but two birds that I assumed to be stragglers from a distance were noticeably nervous, and warily kept out of gunshot. One was a Mockingbird (*Mimus polyglottos*), the other a male Cowbird (*Molothrus ater*), both unmistakable as to species but quite unapproachable, especially so in the thickets of thorn bushes and cactus that formed their refuge. In and around a lagoon immediately behind the beach there were a number of water birds, among which I recognized White-faced Glossy Ibis (*Plegadis guarauna*), Snowy Egret (*Egretta thula*) and Spotted Sandpiper (*Actitis macularia*). A flock of 20 or 25 Blue-winged Teal (*Querquedula discors*) was approached near enough so that I could see that several males had the white head markings of the described subspecies "*albinucha*." Two Belted Kingfishers (*Ceryle alcyon*) remained near the lagoon.

Braithwaite Cove, Socorro Island, Mexico, March 29. The only migrant seen here was a Semipalmated Plover (*Charadrius semipalmatus*). There had been on the Zaca for the preceding year or more a caged dove, one of the small East Indian species of the genus *Geopelia*, which escaped at this point and flew ashore. There are on Socorro two native species of doves, a *Columbigallina* that is somewhat smaller than the *Geopelia*, a *Zenaidura* that is somewhat larger. It is conceivable that the escaped bird might mate with either of these, and the occurrence is mentioned here in the remote possibility of the future capture of an otherwise puzzling "mutant", the offspring of such a mixture.

There have been fifteen species of northern wading birds reported from the Galapagos, some common and of regular occurrence, others known only from one or two instances. Individuals of any of these species may remain through the summer, in non-breeding condition. All are noticeably wary as compared with the unsophisticated residents of the islands. Turnstones or Tattlers will flee with noisy protest when approached, while the Oyster-catchers with which they are associated view the approaching stranger undisturbed, with only an expression of mild interest.

While I was sitting at lunch before a restaurant on the water front at Acapulco, Mexico, April 2, a Stilt Sandpiper (*Micropalama himantopus*) alighted in the road a few yards away. This bird was curiously tame, so much so that at first I thought it to be injured, but it eventually took flight. At a fresh-water pond near Villamil, Albemarle Island, two Stilt Sandpipers were seen April 27, one April 28. All of these, as well as the Acapulco bird, were in the bar-breasted summer plumage. A Greater Yellow-legs (*Totanus melanoleucus*) was flushed from the same pond on April 29.

Black-bellied Plovers (*Squatarola squatarola*) appeared on many beaches. They were definitely recognized at Wreck Bay, Chatham Island, April 15, at Villamil, Albemarle Island, April 27 (one flock of ten or more) and April 29, and at Narborough Island, May 31. All were in winter plumage. Semipalmated Plovers (*Charadrius semipalmatus*), also common, were identified at Post Office Bay, Charles Island, April 23, at Villamil, April 27 (20 or 30 birds), at Academy Bay, Indefatigable Island, May 5, and on the west coast of Albemarle Island, May 22.

The Hudsonian Curlew (*Phaeopus hudsonicus*) was seen along the sandy beach at Villamil, April 27, fifteen or more; and single birds were noted at Narborough Island, May 31, and at Conway Bay, Indefatigable Island, June 8. The beach at



Villamil was well populated with waders while we were there, and together with the Semipalmated Plover and Hudsonian Curlew on April 27 I saw Sanderlings (*Crocethia alba*)—20 or 25—and Least Sandpipers (*Pisobia minutilla*)—10 or 12—both of these being species that I did not encounter elsewhere.

The Common Turnstone (*Arenaria interpres*) was seen at Hood Island, April 19 to 22 (one flock of as many as ten birds), at Academy Bay, Indefatigable Island, May 5, on the west coast of Albemarle, May 22, and on Narborough Island, May 31. Birds shot in May are molting into summer garb but in a half-hearted manner; they apparently would never assume full breeding plumage. Wandering Tattlers (*Heteroscelus incanus*) were widespread. Some were seen on various occasions from our first landing at Wreck Bay, Chatham Island, April 18, until we reached North Seymour Island, June 12, four days before our departure from the Galapagos.

While we were south-bound from Acapulco two Barn Swallows (*Hirundo erythrogaster*) came aboard the *Zaca* on April 10, in latitude 10° 29' N., longitude 89° 53' W. They rested in the rigging for half an hour, then flew straight to the northwest. It required the evidence of a map to convince me that they were quite correctly headed for the coast of Mexico. Several Barn Swallows were seen on Hood Island, April 19. A Cliff Swallow (*Petrochelidon albifrons*) came aboard on April 13, in latitude 2° 30' N., longitude 91° 20' W. The Cliff Swallow has never been seen in the Galapagos Archipelago, but this northbound individual appeared such a short distance away as to justify the assumption that it had come from the islands. Several Bank Swallows (*Riparia riparia*) were seen on Hood Island, April 19, flying up and down along the beach, together with the Barn Swallows.

Of the species here listed, the Stilt Sandpiper, Greater Yellow-legs, Cliff Swallow, and Bank Swallow are for the first time reported from the Galapagos. As it happens, no specimens were collected of any of these, but they were all clearly recognized and I have no hesitation in publishing the records.

Finally, let me add a slight contribution to a current discussion in the Auk regarding the color of the eye in certain grackles. In and about Acapulco, Mexico, there were Boat-tailed Grackles in abundance, many of them apparently nest building. The male birds all had light-colored eyes, white in appearance as seen from a distance of a few yards.—H. S. SWARTH, *California Academy of Sciences, San Francisco, December 15, 1932.*

## EDITORIAL NOTES AND NEWS

The Eighth Annual Meeting of the Cooper Ornithological Club will be held in the San Francisco Bay region in the early part of May, 1933. The sessions for the presentation of papers will be held under the immediate auspices of the Museum of Vertebrate Zoology in the Life Sciences Building, University of California, Berkeley. President Loye Miller, of the Board of Governors of the Club, has appointed the following local committee to arrange for this meeting: General Chairman, Alden H. Miller; Hospitality, Amelia S. Allen; Affiliations, H. S. Swarth; Meeting Places, James O. Stevenson; Finance, T. I. Storer; Program, J. Grinnell. Details as to program, etc., will be announced in the March issue of *The Condor*. The Twelfth Annual Meeting of the Board of Governors will be held in connection with the Annual Meeting of the Club.

Word comes that Dr. Herbert Friedmann, Curator of Birds in the United States National Museum, has now undertaken as his major activity the completion

of Bulletin 50, "The Birds of North and Middle America", eight volumes of which appeared from 1901 to 1919 under the authorship of the late Robert Ridgway. At least two additional volumes will be necessary to complete the entire enterprise, these treating of the rails and their allies, the gallinaceous birds, the diurnal birds of prey, and the water-birds comprised in the first six orders listed in the Fourth Edition of the A. O. U. Check-list. This in itself is a huge undertaking, far greater probably than any two of the preceding volumes. For the past twenty years or so have seen vast increase in the literature and the specimens available in those several groups yet to be treated. The organization of all this material will mean for certain of the groups, a practically complete systematic revision. We have confidence that Dr. Friedmann, with his background of high-grade accomplishment, will conclude his new task successfully on the basis of modern method and concept. American students of birds can now be

rendered no greater service by our National Museum than the completion of this great work. We must all be patient, however, in looking for the published results, recognizing the great amount of time, labor and expense required for doing thorough work of this comprehensive nature.—J.G.

Important to everyone working actively in, or essaying to understand the intricacies of, systematic zoology is a knowledge of the working rules governing the practices in that field. Copies of "The International Rules of Zoological Nomenclature" (28 pp., reprinted, 1926) can now be had at 50 cents from the Secretary of the Biological Society of Washington, J. S. Wade, U. S. Bureau of Entomology, Washington, D. C.

A new manual for collectors has just appeared as Bulletin No. 69 from the National Museum of Canada, under the title "Methods of Collecting and Preserving Vertebrate Animals." The author, Dr. R. M. Anderson, has gathered together in this 140-page illustrated manual all the latest "wrinkles" in field practice, such as we have reason to know will be profitable to the seasoned collector, let alone the beginner. Dr. Anderson has drawn upon his own extensive field experience, and he has also elicited help from many other active collectors. For example, Allan Brooks' special method of making skins of waterfowl is fully described; and no one who has seen them can but admire the results of Brooks' methods, from both the standpoint of permanence and that of beauty and symmetry of make. This manual may be had for 25 cents (from the National Museum of Canada, Ottawa), therefore putting it within easy reach of everyone who collects birds or mammals and who aspires to improve his product.—J.G.

Bird conservation presents an ever-changing problem to those in whose minds this cause rises as one worthy of active attention. An admirable example of scientific attack on one phase of this problem is afforded by the current work of S. Prentiss Baldwin and his associates at the Baldwin Bird Research Laboratory and Western Reserve University, Cleveland. The lines of this scientific attack are learnable from the paper entitled "The Protection of Hawks and Owls in Ohio," just issued through the Ohio Journal of Science (vol. 32, no. 5, September, 1932, pp. 403-424) under the authorship of S. Prentiss Baldwin, S. Charles Kendeigh,

and Roscoe W. Franks. Entirely new data are presented; and the ways of handling the evidence and the conclusions drawn by the authors can be studied to advantage by conservationists everywhere. Briefly to quote: "The above information shows clearly that the general hawk and owl populations in Ohio have beneficial food habits and are powerful agents in the natural control of rodents. It is not best to distinguish too closely between species, because they all exert some important, controlling influence in nature, and the average person is not able to identify the different forms nor able properly to judge between the beneficial and harmful species. It is rather best to pass judgment on the hawk population as a whole and the owl population as a whole and base our state control measures upon whole populations rather than on each species separately." Here, we believe, is a sound principle, to be given heed in various other directions. In this same connection we would call particular attention to the valuable article by Paul L. Errington in the present issue of *The Condor*.—J.G.

#### PUBLICATIONS REVIEWED

PHYSIOLOGY OF THE TEMPERATURE OF BIRDS<sup>1</sup> as it is presented by Baldwin and Kendeigh leads directly to the problems which confront the bird watcher. Students of birds in the field welcome any information which explains for them some phase of the physiology—activity—of birds. They will be attracted to the present work for several reasons. First, the authors have combined long experience with animals in the wild with advanced technical knowledge both as regards use and development of equipment and proper capture and care of birds used in tests. They have studied previous work relating to the subject and have incorporated it into their results. They have organized and presented their material to give a maximum of clarity and meaning, but at the same time have used restraint not to invent, or contribute to, unsupported theories. In the words of the writers "final results and conclusions have not been obtained on any one phase of the general problem. Each item in the physiology of bird temperature is now ready for more detailed and analytical investi-

<sup>1</sup>Physiology of the Temperature of Birds, by S. Prentiss Baldwin and S. Charles Kendeigh. Sci. Publs. Cleveland Mus. Nat. Hist., III, October 16, 1932 (received at Mus. Vert. Zool., Nov. 7), x + 196 pp., pls. 1-7, figs. 1-41, frontispiece.

gation. The survey here presented will aid in orienting and correlating such special studies in the problem of bird temperature."

Eastern House Wrens supplied most of the records and these were obtained mainly during the breeding season. This species is considered typical of small passerine birds in its temperature reactions. Various types of thermocouples used in connection with indicator and recording potentiometer pyrometers were the chief instruments. Perfecting the adaptation of these for the measurement of avian temperatures probably constitutes the most important part of the work of the present authors.

The twenty-three tables and forty-one figures, mostly charts, are models of clear presentation of facts. Nearly one hundred bibliographic references include practically all papers which have a direct bearing on the physiology of temperature in birds. All temperature records are given in both Fahrenheit and Centigrade scales.

A standard temperature was determined (104.4° F. in the male house wren) and used as a basis for comparing factors which influence body temperature. It would seem particularly desirable that this constant be based on records taken at seasons other than the breeding time, for with the varied physiological changes that are known to occur seasonally the standard temperature of non-breeding birds would surely be more characteristic of the species. These workers indicate (p. 28) that they suspect this, but of course such measurements could not be made.

A few points selected from the many lines of evidence considered will indicate the importance of such studies for interpreting the normal activities of birds. First, it must be recalled that mechanisms regulating heat production and heat loss determine the actual temperature. The ingestion of food into the body is associated with a rise in the bird's temperature. Death in the smaller passeriform birds from lack of food at ordinary air temperatures occurs within a very few hours, possibly from some defect caused by undernourishment. Moderate fluctuations in the normal air temperature have little or no effect on the bird's temperature. The peripheral circulation of blood is so rapid and perfect, and the skin is so well insulated with feathers, that variations in air temperature to which birds are exposed do not greatly affect the relation between skin and body temperatures. Greater amount of activity of birds in

summer probably accounts for higher daily temperature in summer. Muscular activity is mainly responsible for the regular daily rhythm in body temperature. Feathers may furnish as much protection against direct solar radiation as they do against intense cold. In the house wren the optimum incubation temperature is probably below 100° F., and a fluctuating temperature may be more favorable than a constant one.

It is not possible to pronounce the book absolutely free of error although it misses this distinction by a narrow margin. No indication is given the reader that the "crow" mentioned (p. 97) in a reference to an American writer is not the common species in the United States, but it is the carrion crow (*Corvus corone*) of Europe. It has not yet been demonstrated that the seasonal variation in the thyroid gland referred to occurs in our crow. The bibliographical reference (p. 166) to Groebels (1928a) should have been to Pfügers Archiv für die gesamte Physiologie des Menschen und der Tiere, not to Zeitschrift für Biologie. The name of the publication, Anatomical Record, is misspelled in two places in the book. However, minor slips of this nature are so infrequent that they should be ignored in considering the usefulness of the volume.

A more serious objection may be found in giving almost one-eighth of the book to an index. While it may be better to make an index too complete than too scant, no doubt many readers would prefer to have had at least fifteen of those pages devoted to the application and interpretation of the findings, mentioned on page 6.

Final appraisal of this publication involves an appreciation of it as an indicator of the growing tendency to employ the tools and suggestions of the laboratory in analyzing purely out-door problems of natural history. Wider adoption of this viewpoint may bring a surprising acceleration of progress in solving these problems.—JEAN M. LINSDALE.

DESCRIPTIONS OF NEW BIRDS FROM THE MOUNTAINS OF SOUTHERN NEVADA. By A. J. van Rossem. Trans. San Diego Soc. Nat. Hist., vol. 6, no. 22, June 5, 1931, pp. 325-332.

A PARTIAL STUDY OF THE CANADIAN SAVANNA [sic] SPARROWS, WITH DESCRIPTION OF *Passerculus sandwichensis campestris*, SUBSP. NOV. THE PRAIRIE SAVANNAH SPARROW. By P. A. TAVERNER. Proc. Biol. Soc. Wash., vol. 45, Nov. 10, 1932, pp. 201-206.

DESCRIPTIONS OF NEW BIRDS FROM OREGON, CHIEFLY FROM THE WARNER VALLEY REGION. By Harry C. Oberholser. Scientific Publications, Cleveland Mus. Nat. Hist., vol. 4, no. 1, Sept. 19, 1932, pp. 1-12.

"Outstanding contributions to the study of western birds"—perhaps, but depressing leaflets to one who, like myself, is striving to retain interest in systematic ornithology. Fifty or sixty years ago the study of mammals was emerging from a phase comparable to these present day taxonomic researches in ornithology and it is hard to see why we should lag so far behind. My mind reverts to certain writings of Osgood, in the introduction of his revision of the genus *Peromyscus*, where he gives an illuminating account of the slow development of ideas that preceded his final masterly treatment of an exceedingly difficult group, an account that can be paraphrased to cover the whole study of American mammalogy. Species had been named, here, there and elsewhere, on all sorts of bases and all as distinct entities, an extraordinary patchwork that was beautifully illustrated, both pictorially and as regards "system," in Audubon and Bachman's "Quadrupeds of North America." This patch-work quilt was torn apart by later workers and painstakingly reassembled again and again, in part and as a whole, until finally the real harmonious pattern began to emerge; in some sections, as in *Peromyscus*, with abundant corroborative detail. All this can be paralleled in ornithology, and it was inevitable in both studies that development should have taken the course it did. But there is little excuse today in North America for the addition of more patch-work names; attached with the flimsiest of "basting" and superimposed with little regard for the underlying pattern; and we naturally look for substantial reasons when a new name is inserted into an extremely narrow margin or hem.

To drop the sartorial simile and come to the matters in hand: In van Rossem's paper four "new" birds are named, the Steller Jay, Pygmy Nuthatch, Brown Creeper and Oregon Junco of the locality. It appears to an outsider that the scattered mountain ranges of Nevada, such as supplied these types, might afford just the subject matter needed for studies upon the relationships of the faunas of the Rocky Mountains and the California ranges, a task for some one of ability, possessed of exactitude, and—a discouraging proviso—

some one with patience that sees no need of haste. Whether that student will be grateful for a few miscellaneous names to be juggled about is a question. I should think not. As it happened, I had opportunity to examine the series of juncos, which Mr. van Rossem showed and explained to me, a series conducive to all sorts of speculative surmise undoubtedly, and to be studied carefully in connection with the surrounding forms. Personally, I would not myself have felt justified in coining a name with which to label this little assemblage of variants, nor do I now believe that a name serves any useful purpose. The describer himself says "I do not see how such a case can be handled adequately by our present system of names"! The two pages of comment upon the Junco do not seem to me to have been inspired by much real study. Consider such a statement as this: "Probably no widely distributed genus exists in which the chief divisions are more clearly the result of mutation than in the case of *Junco*." Have we any bird species at all that is "clearly" the result of mutation? And should the glib use of such "tags" and stock phrases be accepted without protest as a satisfactory substitute for carefully considered regional and systematic studies?

Mr. Taverner's contribution, I should say, is condemned at the outset in the unhappy choice of a title, for a *partial* study of the Canadian Savannah Sparrows is not justified. The gist of my whole appeal here is for more nearly *completed* studies. I have myself given a good deal of attention to the western Savannah Sparrows, including personal field work in many regions. I believe that Taverner's conclusions are wrong, but this is not so much to the point here as the demonstrable fact that his comparisons were inadequate. His "*campestris*" with scarcely a doubt is the same as *nevadensis*, a race of which apparently he had no specimens available, but which assuredly should have been taken into account. All the evidence thus far seems to me to indicate that the form we have been calling *alaudinus* (common in winter south to southern California and Arizona) occupies in summer a vast area including interior Alaska and eastward, south to that undetermined region where it meets with *nevadensis*. Any correction of this concept necessarily calls for comparisons with *nevadensis*.

No, I have *not* made careful comparisons of Dr. Oberholser's eighteen new subspecies from central Oregon with re-

lated forms in adjoining valleys, and so, I suppose, any criticisms I might make should be thrown out of court. The point at issue, though, is not so much whether or not there is perceptible in these several series the nice shades or trends that Dr. Oberholser describes. No one, I think, will claim that these new names represent concepts that are comparable with, say, the "subspecies" that were painstakingly admitted by the A. O. U. Committee to the 1910 edition of the Check-list. No curator, I think, but would throw up his hands in despair at the suggestion that he should put his collection and catalogues in order, to accord with these and similar "descriptions." All these recent names, implying a comparison of characters as nebulous and fleeting as melting snowflakes, tend to make our delicate structure of nomenclatural conventions more and more top-heavy and unworkable. They will, so far as is humanly possible, be ignored by the real students of the questions involved. And now, having said my nasty say, let me add that, judging from other publications of the authors here reviewed, I have no reason to question their own ability to deal with those same questions, could they but forget the hunger for mere names and "types."—H. S. SWARTH.

#### MINUTES OF COOPER CLUB MEETINGS

##### SOUTHERN DIVISION

AUGUST.—The August meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday, August 30, 1932, at 8 p. m., in the Los Angeles Museum, Exposition Park, Los Angeles, with Vice-president J. McB. Robertson in the Chair and twenty members and guests present. Minutes of the Southern Division were read and a correction noted. Minutes approved. Minutes of the Northern Division were read.

Chester Lamb reported the presence of the Mexican Ground Dove at San Ysidro, California, and mentioned that another record had been noted for Escondido, California. He also reported the presence of English Sparrows in Mazatlan and four to six hundred miles south in Lower California. Mr. Willett noted the presence of various species of migratory birds now in southern California waters, mentioning the Pink-footed Shearwater in flocks of about a dozen, and much larger flocks of Sooty Shearwater, the Black-vented being conspicuous by their absence. Common

Terns were present and one jaeger. Curlews and godwits were seen five to six miles off-shore, and murrelets seemed to be particularly numerous. Mr. Willett also pointed out that information on the migration of orioles in the fall is exceedingly scanty and suggested that the subject is worthy of more attention, especially as to the difference in time at which the sexes migrate. He also raised the question as to when the English Sparrow first reached the borders of the state and requested information on the nesting season of this species in southern California, mentioning that no records seem to be available on the subject. J. McB. Robertson responded with the information that he had seen young English Sparrows during the latter part of July and again in August. The sparrows select as their nesting sites the spaces between the roofing tiles and the eaves. Dr. Rich described the nests of the English Sparrows in New York State, upon their first appearance in that section, as being built in hardwood trees, domed, and with a side entrance. Later the species took up the present habit of nesting in holes and crevices. Mr. McCoy reported English Sparrows utilizing the nests of Cliff Swallows in April. Mr. Little reported that the sparrows nest in the machine-shops of the industrial section of Los Angeles, in spite of the loud and incessant noises.

Mr. Glassell described some of his recent observations in British Columbia, stating that the Bald Eagles appear to be holding their own in that territory. Miss Hager mentioned the presence of three gulls, species not definitely known, on top of Mt. San Antonio during a high wind, and three or four Cedar Waxwings in Big Pines on August 19. Dr. Rich inquired as to whether any one had knowledge of Mockingbirds rearing three broods of young during a summer, stating that this might be possible judging from recent observations. Raisins had proved an attractive food for the species. Mr. Appleton mentioned the use of the same food for attracting bluebirds in the San Fernando Valley and stated that the species had been induced to nest in bird boxes there.

Adjourned.—R. B. COWLES, *Secretary*.

SEPTEMBER.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday, September 27, 1932, at 8 p. m., in the Los Angeles Museum, Exposition Park, Los Angeles, with President Michener in the



Chair and twenty-three members and guests present. Minutes of the Southern Division were read and approved; minutes of the Northern Division were read.

Applications for membership were read as follows: Arthur P. Marshall, 778 Higuera St., San Luis Obispo, California, and Allan Robert Phillips, P. O. Box 357, Scarsdale, New York, both by W. Lee Chambers.

Dr. Miller briefly described the finding and identification of a bone fragment of a flightless auk, the second known specimen of the species, and explained the geological significance of the find. Mr. Peyton reported on the damage caused by the recent fire back of Piru, Fillmore and Santa Paula, stating that it was so severe that the brush had burned down to the roots. Rangers had reported seeing a mountain lion and three bears crossing the burned area, and the finding of many animals killed by the flames. Condors had not been reported from the vicinity of the fire, although the region about one of the nesting sites had been burned off. One known Condor nesting site fortunately escaped damage.

Mr. McCoy reported a flock of White Pelicans numbering 250 to 300 from Lake Elsinore; the birds were difficult to approach, but were seen closely enough to be sure of their identity. Mr. Glassell described the numbers and damage caused by the Japanese Starling around Vancouver, and Dr. Bishop commented on the fact that the colonies appear to be intensively rather than extensively developed. Mr. van Rossem described some of his observations on the Charleston Mountains and vicinity, commenting on the plumage of the Linnets. Mr. Willett reported briefly on this season's migration of marine birds, noting particularly their relative scarcity. Attention was also drawn to the migration of White-crowned Sparrows and the need for additional records for the San Diego region. Mr. Michener and John McB. Robertson contributed notes on the species which emphasized the scarcity of information, and the need for more such observations.

Adjourned.—R. B. COWLES, *Secretary*.

OCTOBER.—The regular monthly meeting of the Cooper Ornithological Club, Southern Division, was held on Tuesday, October 25, 1932, at 8 p. m., in the Los Angeles Museum, Exposition Park, Los Angeles, with President Michener in the Chair and thirty members and guests present. Min-

utes of the Southern Division were read and approved.

An application for membership was read, as follows: Frederick A. Hemphill, 128 Broad Street, Elizabeth, N. J., by W. Lee Chambers. A committee appointed by President Michener presented the following resolution:

Whereas, in the death of Barton Warren Evermann systematic biology has lost a friendly and encouraging spirit, older men have lost a loved and respected colleague, and the present has lost to history an outstanding builder of standards based on sound judgment and discrimination; be it therefore Resolved, that the Cooper Ornithological Club, recognizing its great loss, hereby place on record its indebtedness to this tireless worker for his inspiring example and for the rich contribution that a lifetime of activity has left to the literature of Natural History.

Raymond B. Cowles, Caroline P. Canby, Loye Miller, Chairman, October 20, 1932.

It was moved and seconded that the resolution be adopted. Motion carried by an unanimous vote.

Dr. Loye Miller, the speaker of the evening, talked on the topic "Fossil Birds." The need for preservation of skeletal material was stressed and illustrating this need a comparison was drawn between the abundance of available ornithological material as found in skins and the paucity of skeletal material. Other phases of paleontological ornithology were discussed, notably under such topics as the place of such studies as a means for determination of distribution in relation to geographic areas in periods of time, that is, time-space relationships; reconstruction of previously existing conditions for comparison with the present; training in observation and synthesis; and other fields of importance.

Adjourned.—R. B. COWLES, *Secretary*.

#### NORTHERN DIVISION

SEPTEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, September 22, 1932, at 8:00 p. m., in Room 2003, Life Sciences Building, Berkeley, with President Linsdale in the Chair and seventy-eight members and guests present. Minutes of the Northern Division for August were read and approved. Minutes of the Southern Division for August were read.

Applications for membership were read as follows: Herbert Beverly Blanks, 845 Contra Costa Ave., Berkeley, Calif., by J. Grinnell; Mrs. Laura Anne Richardson, 5216 Proctor Ave., Oakland, Calif., by Hilda W. Grinnell.



The committee appointed at the August meeting to draw up resolutions on the death of Ralph Hoffmann presented the following through their Chairman, Mr. Alden H. Miller, who moved their adoption:

Whereas, in the untimely death on July 21, 1932, of Ralph Hoffmann, Director of the Santa Barbara Museum of Natural History, the Club has lost an eminent teacher of ornithology, one who instructed largely through the medium of his scholarly and highly practical bird guides, and whose influence in the ranks of the amateur bird student has been of exceeding value, especially in that it has stimulated appreciation of birds and at the same time accurate observation, and

Whereas, he has been respected by his fellow ornithologists for his wide knowledge of the habits of birds and for his zeal to make new avian acquaintances, and

Whereas, his scholarly attainments and his search for beauty in all objects of nature have well fitted him for his able direction and development of the Museum at Santa Barbara, be it therefore

Resolved, that we of the Northern Division of the Cooper Ornithological Club hereby express our deep sorrow at the loss of this valued member and our appreciation of his services to all students of birds. Be it further

Resolved, that a copy of these resolutions, with an expression of our sincere sympathy be sent from the Club to the family.

Amy Rinehart, Brighton C. Cain, Alden H. Miller.

The motion to adopt was seconded by Mr. Dixon and unanimously passed.

Mr. Pease reported that two weeks ago he trapped the first Gambel Sparrow of the returning winter visitors and found that it bore one of his own last year's bands. Mrs. Allen reported that fall migrants are coming in tardily this year. A few days ago she noted a small group of Savannah Sparrows near the end of the Arlington Avenue car line. Mr. Swarth told of seeing the Black Vulture near Tucson, Arizona, several years ago, and last week observing it between Tucson and Yuma. He predicted its appearance before long in the Imperial Valley. Mr. Tonkin told of a recent experience with a young eagle on a tributary of the Pit River. When first seen the bird was standing on a rock near the stream bed. When approached it ran rapidly up the hillside to a position far above the creek before launching into the air. Mr. Tonkin asked whether other observers had noted any young eagle seeking a "take-off" for flight. Mr. Dixon replied that he had seen a young Golden Eagle behave in a manner similar to that observed by Mr. Tonkin. Mr. Cain presented several observations of interest, among them the first fall appearance of the Townsend Warbler, on September 15. Mr. Blanks told of seeing a Calaveras Warbler, rare in this region, on September 14 at his home in North Berkeley.

The speaker of the evening was Mr. George M. Wright of the National Park Service, who reported upon the "Birds of Yellowstone's Waters." The knowledge acquired during three summers of field work in this Park combined with Mr. Wright's marked ability to describe birds and their backgrounds animated anew the sympathy we all have for the Trumpeter Swans in their endeavor to rear young in the face of overwhelming odds. We were familiarized also with the conditions under which Sandhill Cranes, Canada Geese, Ospreys, White Pelicans, gulls and many of the shore birds spend their summers in the Yellowstone.

Adjourned.—HILDA W. GRINNELL, Secretary.

OCTOBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held at 8:00 p. m., Thursday, October 27, 1932, in Room 2003, Life Sciences Building, Berkeley, with about sixty-five members and guests present. Minutes of the Northern Division for September were read and approved. The following were proposed for membership in the Club: Eric Campbell Kinsey, Box 76, Manor, California, by T. T. McCabe, through the Western Bird-banding Association; James L. Peters, Museum of Comparative Zoology, Cambridge, Mass., by J. Grinnell; Mrs. R. M. Sims, 36 Hillcrest Road, Berkeley, California, by Mrs. A. S. Allen. A letter from Mrs. Ralph Hoffmann, expressing her appreciation of the Club's message of sympathy upon the death of her husband, was read. Acting upon behalf of the appointed committee Mr. Grinnell read the following set of resolutions upon the death of Dr. Evermann and moved their adoption.

Whereas, the passing of Barton Warren Evermann, Honorary Member and one of the Board of Governors of the Cooper Ornithological Club, has taken away one who endeared himself to all of its members by his genial nature, his perennial enthusiasm, his love and interest in the whole field of natural history; and

Whereas, Dr. Evermann has been a valued member of our society for more than twenty years, during which time our debt to him has been constantly increasing; therefore be it

Resolved, that we hereby place on record our deep realization that the removal of such a man leaves a vacancy that will not be filled; and be it further

Resolved, that the Secretary be instructed to transmit a copy of these resolutions with the sincere sympathy of the Club to his family.

George M. Wright, William E. Ritter, Joseph Grinnell, Selma Werner, Chairman.

Prof. Ritter in seconding this motion sketched Dr. Evermann's association with the California Academy of Sciences. The motion carried unanimously.

Mrs. G. E. Kelly told of watching a Ruby-crowned Kinglet feeding in a crab-apple tree at her home in Alameda and noting the "flashing" of the red crown patch.

Dr. Ritter then gave the talk of the evening, the outstanding scientific program of the year, a philosophical discussion of "An Exhibition of the 'Fighting Instinct' in Birds," as displayed by a California Brown Towhee outside his window at the Museum of Vertebrate Zoology. The "shadow boxing" of this bird with its reflection in the glass of the window-pane was noticed first on May 2 by both Dr. Ritter and Mr. Seth Benson who occupied the adjoining room. Until July 11, when the bird's activities ceased, notes were kept and a conservative estimate made which led the observers to believe that the bird had assaulted its reflection in the glass at least eight thousand times.

In response to queries as to whether the towhee were not demented, Dr. Ritter replied that the bird had never been "mented", that is, that it did not possess a brain equipped to deal with the situation through reasoning ability. In other words the towhee's brain is so constituted that it can not do otherwise than fight an apparent invader of its territory during the nesting season. The comparative anatomy of the brains of reptiles, birds and mammals was discussed by Dr. Ritter and differences pointed out.

Dr. Ritter's study of the towhee's actions and his interpretations thereof from the physiological and philosophical viewpoints made us all realize the fallacy of trying to explain bird behavior in terms of human experience.

After the adjournment of the meeting many members lingered to listen to a phonographic record of eastern bird songs presented to the secretary by Albert Brand, whose description of his technique of recording them is published in the October *Auk*.

Adjourned.—HILDA W. GRINNELL, *Secretary*.

NOVEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held Thursday, November 17, 1932, at 8:00 p. m., in Room 2003, Life Sciences Building, Berkeley, with Jean M. Linsdale presiding and about 125 members and guests present. Minutes of the previous meeting and of the Southern Division were not available. Proposals of new members included Miss Esther

Crissey Hendee, Department of Zoology, University of California, Berkeley, and Mr. W. D. Baker, Science Department, John Muir Junior High School, Burbank, California, by Mr. E. L. Sumner, Sr., through the Western Bird-banding Association, and Mr. Ralph Gillespie, Bay City Business College, Bay City, Michigan, by Josselyn Van Tyne.

Mr. Cain reported the banding of a Slate-colored Junco; Mrs. H. E. Lindsey the banding of three Bush-tits taken in a W.B.B.A. Warbler trap; and Mr. Clabaugh the recent capture of a Point Pinos Oregon Junco that was first banded by Mrs. Van Zandt at San Rafael in 1931. Mr. B. D. Dexter reported seeing a large number of American Egrets near the Dumbarton Bridge on November 13. Mrs. Allen told of seeing numbers of mergansers at Moss Landing and at the Orinda Country Club. Alden Miller reported the first indications of pairing activities in shrikes and an unsuccessful attempt to trap this species with a live mouse as bait, through the failure of the trap to operate properly. Mr. J. O. Wanzer stated that his brother when traveling by airplane near the mouth of the Amazon had seen two flocks of flamingoes, each of several thousand individuals.

Mrs. Ynes Mexia, the speaker of the evening, presented a vivid series of "glimpses of bird life along the Amazon." Her trip began in San Francisco in 1929 and took her through the canal to Rio de Janeiro, into the interior of Brazil for one and a half years, then to Para, and from there up the Amazon by way of Iquitos and the Pongo de Manseriche to the mouth of the Santiago River. Here, she spent three months in a world made up of the river, forests, and sky, with their different inhabitants which included a few semi-aquatic mammals and many kinds of mammals and birds living in the tops of the trees. The majority of these were much more frequently heard than seen. Mrs. Mexia had specimens to show and interesting facts to tell about hoatzins, toucans, cotorras, ant thrushes, trogons, manakins, honey creepers, hummingbirds, woodpeckers, and various fringillids, tanagers, icterids, falconids, and gallinaceous birds. The brilliant plumage of many of these has led to the use of the feathers or entire skins as ornaments by the Indians. In conclusion, slides of the larger bird species seen at the museum at Para and of the trip up the river were shown.

Adjourned.—MARY M. ERICKSON, *Secretary pro tem*.

